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A COLLATION OF UNITED STATES AIR FORCE ANTHROPOMETRY (U)

KENNETH W. KENNEDY, Ph.D

**HARRY G. ARMSTRONG AEROSPACE MEDICAL
RESEARCH LABORATORY**

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FOR THE COMMANDER



CHARLES BATES, JR.
Director, Human Engineering Division
Armstrong Aerospace Medical Research Laboratory

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PREFACE

This effort was conducted under Harry G. Armstrong Aerospace Medical Research Laboratory (AAMRL) Project 7184, "Man-Machine Integration Technology," Task 718408, "Crew Station Design Techniques and Criteria," and Work Unit 71840835, "Engineering Anthropometry for Systems and Subsystems Design."

For this Collation to exist at all would have been impossible without a great deal of effort on the part of my colleagues and predecessors, many of whom made contributions in the development of body-size data that are of far greater significance than those of mine. I specifically cite Messrs. H.T.E. Hertzberg and (Lt) G.S. Daniels who conceived and supervised the 1950 USAF survey: Messrs. Hertzberg, C.E. Clauser and M. Alexander, the 1965 survey: Mr. Clauser, the 1967 survey: and Mr. Clauser and (Lt Col) P.E. Tucker, the 1968 survey. Mr. E. Churchill directed the analytical support for all USAF anthropometric surveys. The roles of these contributors, as well as those of others, are indicated in more detail in "Annotated Sources."

The intermediate source of much of the information found in "Annotated Sources" and the statistical data listed in the main body of this report is a computer printout of the AAMRL Anthropometric Data Bank (Ref. 2). This in-house document was prepared by the staff of Anthropology Research Project, Inc., Yellow Springs, Ohio, under the direction of Dr. J.T. McConville. The AAMRL Anthropometric Data Bank was conceived by Mr. C.E. Clauser, of the Workload and Ergonomics Branch (AAMRL/HEG) and initiated by him and by Dr. McConville.



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INTRODUCTION

Four major anthropometric surveys of United States Air Force personnel have been conducted since the end of World War II, in 1950, 1965, 1967, and 1968. During the 1950 survey, male rated and non-rated flying personnel were measured. Data from this survey were first reported in 1954 by Hertzberg, Daniels and Churchill (Ref. 10). In 1965 the subjects were male recruits, enlisted personnel and officers. The Mean, Standard Deviation, and sample size for the total 1965 population can be gleaned with some difficulty along with those from 1950, 1967, and 1968 and other surveys, from Churchill, Churchill and Kikta, 1977 (Ref. 3). More complete summary statistics and correlation coefficients derived from the 1965 data were reported, along with those from 1950, 1967, and 1968, in Churchill, Churchill and Kikta, 1978 (Ref. 4). In 1967, male rated officers and cadets were measured. Summary statistics on 153 dimensions from this survey and similar data gathered in 1968 on West German flying personnel were included in Grunhofer and Kroh (Ref. 9). It is not clear from the Acknowledgements of this report that the USAF survey was conducted by personnel of the U.S Air Force, specifically those of the Aerospace Medical Research Laboratory. Brief summary statistics on 55 dimensions from the 1967 survey were reported in NASA Reference Publication 1024 (Ref. 1). In 1968 a survey was made of USAF women officers and enlisted personnel. The data from this survey were presented by Clauser, et al (Ref. 6). Brief data on 50 dimensions from this survey were also reported in NASA Reference Publication 1024. Summary statistics for all surveys of USAF personnel and those for 12 other U.S. military populations were included in MILITARY HANDBOOK, ANTHROPOMETRY OF U.S. MILITARY PERSONNEL (Ref. 7). More complete information regarding the individual surveys and their primary data sources can be obtained by referring to "Annotated Sources."

Reports of the 1950 and 1968 surveys are the only USAF survey reports that are complete to the extent that they promote convenience in obtaining data and certainty of the comparability of dimensions. The completeness of body size data and the fashion in which the 1965 and 1967 surveys have been reported have been guided by other concerns. The result is that the sources of anthropometric data from the 1965 and 1967 surveys are either incomplete, misleading with regard to comparability of dimensions, inconvenient to access, or limited in their availability to the users.

To alleviate difficulties in obtaining and comparing USAF anthropometric data, I have prepared this Collation. In doing so, data describing the major USAF subpopulations are made equally available and in a single source. For additional

information regarding anthropometric comparability, descriptions, and basic summary statistics on other populations, see Garrett and Kennedy (Ref.8).

For the purposes of this Collation, four USAF subpopulations have been distinguished. For the sake of brevity and to facilitate convenient integration into the data pages, they have been designated USAF.MEN, USAFLY.MEN, USAF.WOM, and USAFLY.WOM. USAF.MEN is comprised of the 1236 nonrated officers and enlisted men measured during the 1965 survey. Basic trainees have not been included, even though a sizable number of them (2632) were measured. USAFLY.MEN data are taken primarily from the 1967 survey of 2420 male rated (pilot and navigator) officers and cadets. Dimensions that were not measured during the 1967 survey, but were during the 1950 survey, are also included. When identical dimensions have been measured in both surveys, which is the case for most, data from the 1967 survey are listed. USAF.WOM is composed of the 1905 nonrated women officers, officer trainees, and enlisted personnel measured in 1968. USAFLY.WOM is an artificial subset, derived from the 1968 sample by selecting only those women who meet the Air Force body-size criteria for entry into pilot and navigator training and retention as a rated officer.* The USAFLY.WOM listings have been available in the form of computer printouts only and are the only data currently available that are intended to represent the USAF rated women officers.

Dimension titles are listed alphabetically and cross referenced such that if a user knows a dimension only by a common name, such as "Height," he can be quickly directed to the title used by the Air Force anthropologists, "Stature," where the description and summary statistics are stated. There are many such cross-references. References to dimensions similar to the one of primary concern are also included, the purpose being to alert the user to alternative and related dimensions.

The summary statistics reported here consist of the number of subjects (n), Mean (X), Standard Deviation (SD), and the 1st, 5th, 50th, 95th, and 99th percentiles. Convenient allotment of space did not permit the inclusion of additional data, such as Coefficient of Variation (CV) and additional percentiles. CV is a simple statistic noting the relationship between the Mean and the Standard Deviation and is a convenient indicator of the variability. It can be calculated by dividing the latter by the former. Typically, the result is multiplied by 100 and expressed

* To develop an adequate N, subjects as young as 18 years had to be drawn from the 1968 survey population. The age distribution of the subset, therefore, is skewed to the left, a younger population than that which would be expected. While weight and body breadths, depths, and circumferences may be conservatively estimated, stature and other body lengths are considered to be accurate.

as a percent. Additional percentiles can be approximated through the addition and subtraction of multiples of the Standard Deviation to and from the Mean. Listed in Table 1 are multipliers that can be applied to the Standard Deviation and used to calculate estimates of selected percentiles based on the normal distribution. Their accuracy will be a function of the closeness with which the distribution of the specific dimension approximates normal or symmetry.

Table 1. Factors for Estimating Selected Percentiles *

1st and 99th Percentiles	= $\bar{X} \pm 2.33 \times SD$
2nd and 98th Percentiles	= $\bar{X} \pm 2.06 \times SD$
3rd and 97th Percentiles	= $\bar{X} \pm 1.88 \times SD$
5th and 95th Percentiles	= $\bar{X} \pm 1.65 \times SD$
10th and 90th Percentiles	= $\bar{X} \pm 1.28 \times SD$
15th and 85th Percentiles	= $\bar{X} \pm 1.04 \times SD$
20th and 80th Percentiles	= $\bar{X} \pm 0.84 \times SD$
25th and 75th Percentiles	= $\bar{X} \pm 0.67 \times SD$
30th and 70th Percentiles	= $\bar{X} \pm 0.53 \times SD$
35th and 65th Percentiles	= $\bar{X} \pm 0.39 \times SD$
40th and 60th Percentiles	= $\bar{X} \pm 0.25 \times SD$
45th and 55th Percentiles	= $\bar{X} \pm 0.13 \times SD$

* Tabular data modified from Churchill and Astachan (Ref. 5).

Dimension descriptions have been written and rewritten to follow a format consisting of two parts. The first part describes the body position essential for consistency and standardization. An attempt has been made to eliminate body position information which is not essential to standardization. Such nonessential information appears frequently in the literature and is likely a carry-over from the practical requirement in a survey to pose a subject for a series of measurements rather than just one. When position of the body or body part is not essential to standardization, the notation (Typ) is inserted to indicate that the body position is not critical, but is typical, and found to be most convenient for a variety of reasons. The second part of each description is the actual characterization of the dimension.

The descriptions do not contain information on the mechanics of measurement. Therefore, they are descriptive, only, and not instructional. Rarely have I mentioned the instrument typically used to measure a given dimension. The Collation is intended primarily to be a source of data. It is not an instruction manual.

The sex of the individual being measured is irrelevant for success in measuring most dimensions. That such data would serve any useful purpose, however, is another matter. For instance, since, hopefully, few USAF men wear foundation garments such as those implied in the dimension, "Strap Length" (qv), this dimension when measured on men would have little practical application. To avoid any possible confusion on the part of the extremely naive user, however, I have included the sex of the subject in the descriptions that have functional application only when measured on one sex.

The anthropometric data for three of the four USAF populations treated in this Collation are from single surveys. Data on the USAF male rated officers and cadets, however, are taken from both the 1950 and the 1967 surveys. For the 28 dimensions measured in 1950, but not in 1967, the 1950 data are reported. To distinguish the actual sources for these data, the user can refer to the number of subjects (N) reported for each dimension. With the exception of one dimension, "Menton-Crinion Length" (qv), the N for dimensions from the 1950 survey is 4000. A glance at the description of this dimension will reveal the reason for a smaller N. The N for the 1967 survey data is consistent at 2420.

For the most part, the dimension characterizations, subject postures and techniques of measurement and analysis observed in all USAF surveys are from the same anthropometric tradition established at the Aero Medical Laboratory, Wright-Patterson Air Force Base, in the 1950s by H.T.E. Hertzberg, G.S. Daniels and E. Churchill. It is believed, therefore, that in the vast majority of cases, all data for a given dimension are comparable among the various subpopulations. As a result, significant differences in the data for a given dimension represent significant differences in the populations. As can be expected, a few exceptions to the established tradition have occurred over the 30 or so intervening years. These are indicated in this Collation.

ANNOTATED SOURCES

USAF.MEN - USAF OFFICERS AND ENLISTED - MEN

Survey: 1965 survey of United States Air Force male officers and enlisted personnel

The survey of USAF male personnel conducted during the spring and summer of 1965 was planned and supervised by H.T.E. Hertzberg and later by M. Alexander and C.E. Clauser of the Aerospace Medical Research Laboratory at Wright Patterson Air Force Base, Ohio, and by L.L. Laubach of the Anthropology Research Project then at Webb Associates, Yellow Springs, Ohio. The measuring team was composed of students from Antioch College, Yellow Springs, Ohio. In the first portion of the survey, 683 enlisted men were measured, along with 549 officers and 4 warrant officers. In the second half 106 enlisted men were measured, along with 2,632 basic trainees. All subjects were measured at Lackland Air Force Base, Texas. Data measured on the basic trainees are not included in this Collation.

USAF.FLY.MEN - USAF FLYING PERSONNEL - MEN

Surveys: Primary: 1967 survey of United States Air Force male rated officers.

Secondary: 1950 survey of United States Air Force male flying personnel.

The 1967 survey of United States Air Force male rated officers was conducted during the first three months of 1967. It was planned and conducted under the direction of C.E. Clauser, the Chief of the Anthropology Branch of the Aerospace Medical Research Laboratory (AMRL), Wright-Patterson Air Force Base, Ohio, with the collaboration of M. Alexander, K.W. Kennedy, J. Henninger, and J.W. Garrett of the AMRL, and E. Churchill and L.L. Laubach of the Anthropology Research Project, then at Webb Associates, Yellow Springs, Ohio. Subjects were measured at 17 Air Force bases across the contiguous United States. A total of 182 dimensions were taken on 2420 Air Force personnel between 21 and 50 years of age. Of these, 1187 were rated pilots, 505 were rated navigators, 505 were student pilots, and 188 were student navigators. Thirty-five were found to have AFSCs other than those sought. The measuring team consisted of trained students primarily from Antioch College, Yellow Springs, Ohio. Summary statistics and descriptions of dimensions and measuring techniques for most of the variables are reported in A REVIEW OF ANTHROPOMETRIC DATA OF GERMAN AIR FORCE AND UNITED STATES AIR FORCE PERSONNEL, 1967-1968, edited by H.J. Grunhofer and G. Kroh, and

published as AGARD-AG-205, 1975 (Ref. 9). Brief summary statistics on 58 selected body dimensions also have been reported in Chapter III, "Anthropometry," by J.T. McConville and L.L. Laubach, in ANTHROPOMETRIC SOURCE BOOK, VOL. I, ANTHROPOMETRY FOR DESIGNERS, NASA Reference Publication 1024, 1978 (Ref. 1).

The 1967 survey of USAF flying personnel was the second such major survey of this population. The first was conducted during the spring and summer of 1950. It was organized and directed by H.T.E. Hertzberg and G. Daniels and reported in ANTHROPOMETRY OF FLYING PERSONNEL - 1950, WADC TR 52-321 (AD 47 953), by H.T.E. Hertzberg, G.S. Daniels, and E. Churchill (Ref. 10). Subjects were measured at 14 Air Force bases in 7 states. The measuring team consisted of Antioch College students. The original statistical analysis was the initial activity of the Anthropology Research Project contract staff, then located at Antioch College. The data were analyzed and reported prior to the availability of modern computer facilities. Since this survey was first published, the data have been thoroughly reanalyzed using modern electronic computers. This has made it possible to include actual measured values to the nearest millimeter in the analyses, rather than notating the range within which each value was placed and analyzing the range data rather than the actual. Millimeter figures for most variables originally recorded but not punched on cards were incorporated into the reanalyzed data. Some 63 of the original 4063 subjects with missing body size values have been deleted. The entire body of data has been thoroughly reedited for errors.

USAF.WOM - USAF OFFICERS AND ENLISTED - WOMEN

Survey: 1968 survey of United States Air Force female officers and enlisted personnel

The survey of women of the Air Force was made in the spring of 1968 by the Anthropology Branch, Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio and the Anthropology Research Project, then at Antioch College, Yellow Springs, Ohio. A description of the survey and the results are published in ANTHROPOLOGY OF AIR FORCE WOMEN by C.E. Clauser, et al., AMRL-TR-70-5 (AD 746 113), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1972 (Ref. 6). Data for age, 123 body size measurements, and grip strength were obtained from a sample of 1,905 women. Thirteen measurements were repeated on 1,513 subjects with the subjects wearing foundation garments. Age is reported in tenths of years. Weight is reported in pounds. All other variables were recorded in millimeters.

USAFLY.WOM - 1968 Subset of female USAF personnel meeting the body size requirements for entry into USAF Undergraduate Pilot Training and retention as a rated officer.

The subset to represent women pilots was extracted by selecting from the 1968 USAF survey only those women who meet the Air Force body size criteria for entry into Undergraduate Pilot Training and retention as a rated officer. Specifically, only those women 18 years of age (qv) or older and between 34 and 39 inches, inclusive, in Sitting Height were eligible. In addition, all members of the subset had to meet one of the following Height-Weight relationships.

Height inches	Weight	
	Minimum	Maximum
64	103	139
65	106	144
66	108	148
67	111	152
68	114	156
69	117	161
70	119	165
71	122	169
72	125	174
73	128	179
74	130	185
75	133	190
76	136	196

A COLLATION OF UNITED STATES AIR FORCE ANTHROPOMETRY

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SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

ABDOMINAL DEPTH, SITTING - see also Waist Depth, Standing

Subject sits erect, arms relaxed at sides, forearms and hands directed forward - the horizontal depth of the torso at the most forward protrusive part of the abdomen during quiet breathing.

USAF.MEN	9.62	1.13	7.6	8.0	9.5	11.7	12.9
n = 1236	24.44	2.87	19.3	20.4	24.1	29.6	32.8

ABDOMINAL EXTENSION CIRCUMFERENCE, STANDING - see also Abdominal Extension Circumference Over Foundation Garment, Standing; and Waist Circumference at Natural Beltline, Standing

Subject stands erect - the circumference of the abdomen at the level of maximum relaxed forward protrusion during quiet breathing.

USAF.WOM	33.72	2.87	28.2	29.4	33.5	38.8	42.3
n = 1905	85.64	7.28	71.6	74.8	85.0	98.6	107.4

USAFLY.WOM	33.52	2.02	29.0	30.0	33.7	36.5	37.9
n = 455	85.14	5.13	73.7	76.1	85.5	92.8	96.2

ABDOMINAL EXTENSION CIRCUMFERENCE OVER FOUNDATION GARMENT, STANDING - see also Abdominal Extension Circumference, Standing; and Waist Circumference at Natural Beltline over Foundation Garment, Standing

Subject (female) stands erect, wearing foundation garments of choice - the circumference of the abdomen at the level of maximum relaxed forward protrusion during quiet breathing.

USAF.WOM	34.44	2.86	29.0	30.3	34.2	39.6	43.0
n = 1513	87.48	7.26	73.6	76.9	86.8	100.5	109.3

USAFLY.WOM	34.33	1.96	30.1	31.0	34.4	37.5	39.3
n = 345	87.20	4.99	76.4	78.8	87.3	95.3	99.8

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

ABDOMINAL EXTENSION DEPTH, STANDING - see also Abdominal Extension Depth Over Foundation Garment, Standing; and Waist Depth Over Foundation Garment, Standing

Subject stands erect - the maximum horizontal depth of the abdomen at the level of maximum relaxed forward protrusion during quiet breathing.

USAF.WOM	8.22	.83	6.7	7.1	8.1	9.8	11.0
n = 1905	20.89	2.12	16.9	17.9	20.6	24.8	27.9
USAFLY.WOM	8.13	.56	6.9	7.2	8.1	9.1	9.6
n = 455	20.66	1.43	17.4	18.2	20.6	23.1	24.4

ABDOMINAL EXTENSION DEPTH OVER FOUNDATION GARMENT, STANDING - see also Abdominal Extension Depth, Standing; and Waist Depth over Foundation Garment, Standing

Subject (female) stands erect, wearing foundation garments of choice - the maximum horizontal depth of the abdomen at the level of maximum relaxed forward protrusion during quiet breathing.

USAF.WOM	7.80	.97	6.1	6.5	7.7	9.6	11.0
n = 1513	19.80	2.46	15.4	16.4	19.5	24.4	27.9
USAFLY.WOM	7.61	.67	6.2	6.5	7.6	8.8	9.4
n = 345	19.34	1.71	15.7	16.6	19.3	22.3	24.0

ABDOMINAL EXTENSION HEIGHT, STANDING - see also Abdominal Extension Height over Foundation Garment, Standing; and Waist Height at Natural Beltline, Standing

Subject stands erect - the vertical distance from the floor to the level of maximum relaxed forward protrusion of the abdomen during quiet breathing.

USAF.WOM	36.67	1.74	32.8	33.9	36.6	39.6	40.9
n = 1905	93.15	4.42	83.4	86.1	93.0	100.7	104.0
USAFLY.WOM	38.20	1.33	35.5	36.2	38.1	40.6	41.8
n = 455	97.02	3.37	90.2	91.9	96.7	103.2	106.2

ABDOMINAL EXTENSION HEIGHT OVER FOUNDATION GARMENT, STANDING - see also Abdominal Extension Height, Standing and Waist Height at Natural Beltline, Standing

Subject (female) stands erect, wearing foundation garments of choice - the vertical distance from the floor to the level of maximum relaxed forward protrusion of the abdomen during quiet breathing.

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.WOM	36.55	1.70	32.8	33.8	36.5	39.4	40.6
n = 1513	92.84	4.31	83.2	85.8	92.8	100.1	103.0
USAFLY.WOM	37.98	1.33	35.2	35.9	37.9	40.3	41.4
n = 345	96.46	3.37	89.5	91.2	96.3	102.4	105.1

ACROMION HEIGHT, SITTING - see also Acromion Height, Standing and
Midshoulder Height, Sitting

Subject sits erect, head in the Frankfort plane, arms hanging relaxed, and forearms and hands extended forward horizontally - the vertical distance from the sitting surface to the right Acromiale.

USAFLY.MEN	24.04	1.12	21.4	22.2	24.0	25.9	26.7
n = 2420	61.05	2.85	54.4	56.5	61.0	65.9	67.7

ACROMION HEIGHT, STANDING - see also Acromion Height, Sitting and
Midshoulder Height, Sitting

Subject stands erect - the vertical distance from the standing surface to the right Acromiale.

USAF.MEN	56.82	2.45	51.2	52.8	56.8	60.9	62.8
n = 1236	144.32	6.22	130.0	134.2	144.3	154.7	159.5
USAFLY.MEN	57.17	2.26	51.9	53.4	57.2	60.9	62.4
n = 2420	145.21	5.75	131.9	135.7	145.2	154.8	158.6
USAF.WOM	51.91	2.16	47.3	48.4	51.9	55.6	57.0
n = 1905	131.86	5.48	120.1	123.0	131.7	141.1	144.7
USAFLY.WOM	54.00	1.47	51.3	51.8	53.9	56.7	57.9
n = 455	137.16	3.74	130.3	131.6	136.8	143.9	147.0

ACROMION-RADIALE LENGTH - see also Shoulder-Elbow Length

Subject stands erect (Typ) with arms hanging at sides - the straight-line distance between the right Acromiale and the right Radiale.

USAFLY.MEN	12.97	.67	11.4	11.9	13.0	14.1	14.6
n = 2420	32.95	1.70	29.1	30.2	32.9	35.8	37.0
USAF.WOM	12.21	.64	10.8	11.1	12.2	13.2	13.7
n = 1905	31.01	1.63	27.4	28.3	31.0	33.6	34.7
USAFLY.WOM	12.61	.54	11.3	11.7	12.6	13.5	14.0
n = 455	32.02	1.36	28.7	29.6	32.1	34.2	35.5

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

ACROMION-TO-BICEPS CIRCUMFERENCE LEVEL

Subject stands erect (Typ) with arms hanging at sides - the straight-line distance between the right Acromiale and the indentation at the distal margin of the deltoid muscle.

USAFLY.MEN	7.48	.59	6.1	6.5	7.5	8.5	8.9
n = 2420	19.01	1.50	15.6	16.5	19.0	21.5	22.6

AGE (In years, as of last birthday)

USAF.MEN	29.81	7.24	18.3	19.8	29.2	42.8	49.4
n = 1236							

USAFLY.MEN	30.03	6.31	22.1	22.6	28.3	42.8	45.7
n = 2420							

USAF.WOM	23.43	6.45	18.1	18.3	21.0	38.9	46.5
n = 1905							

USAFLY.WOM*	23.35	6.12	17.8	18.0	20.9	38.2	43.6
n = 455							

* NOTE:

Summary statistics regarding age of the rated women officers obviously do not reflect accurately those expected from an actual population of USAF women rated officers. To develop an adequate N, subjects as young as 18 years had to be drawn from the 1968 USAF survey population. The age distribution of the subset, therefore, is skewed to the left, a younger population than that which would be expected. While weight and body breadths, depths, and circumferences may be conservatively estimated, stature and other body lengths are considered to be accurate.

ANKLE BREADTH - see Bimalleolar Breadth

ANKLE CIRCUMFERENCE

Subject stands with legs slightly apart - the minimum circumference of the right ankle.

USAF.MEN	8.83	.52	7.7	8.0	8.8	9.7	10.2
n = 1236	22.43	1.32	19.6	20.3	22.4	24.7	25.9

USAFLY.MEN	8.82	.50	7.7	8.0	8.8	9.7	10.1
n = 2420	22.41	1.26	19.7	20.4	22.4	24.6	25.6

USAF.WOM	8.30	.51	7.2	7.5	8.3	9.2	9.6
n = 1905	21.09	1.29	18.3	19.0	21.0	23.3	24.4

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAFLY.WOM	8.44	.45	7.5	7.8	8.4	9.3	9.6
n = 455	21.44	1.15	19.0	19.7	21.4	23.5	24.5

ANKLE HEIGHT - see also Lateral Malleolus Height and Medial Malleolus Height

Subject stands with weight equally distributed on both feet - the height from the floor to the minimum circumference level of the right ankle.

USAF.MEN	5.11	.61	4.0	4.3	5.0	6.2	6.7
n = 1236	12.99	1.54	10.2	10.8	12.8	15.8	16.9
USAFLY.MEN	5.40	.45	4.5	4.7	5.4	6.2	6.5
n = 2420	13.72	1.15	11.4	12.0	13.6	15.8	16.6
USAF.WOM	4.41	.53	3.4	3.6	4.4	5.4	5.8
N = 1905	11.19	1.35	8.7	9.2	11.1	13.6	14.7
USAFLY.WOM	4.56	.54	3.6	3.7	4.5	5.6	5.9
n = 455	11.58	1.37	9.1	9.5	11.5	14.1	15.1

ANTERIOR NECK LENGTH - see also Posterior Neck Length

Subject stands erect, head in the Frankfort Plane - the surface distance from chin-neck intersect to Suprasternale.

USAF.MEN	3.67	.57	2.4	2.7	3.7	4.6	5.0
n = 1236	9.32	1.45	6.0	6.9	9.3	11.7	12.8
USAFLY.MEN	3.32	.66	1.6	2.2	3.4	4.4	4.8
n = 2420	8.43	1.68	4.0	5.5	8.5	11.1	12.1

ANTERIOR WAIST LENGTH - see Waist-Front Length

ARM CIRCUMFERENCE - see Axillary Arm Circumference and Biceps Circumference, Extended

ARM REACH FROM WALL - see also Thumb-Tip Reach and Maximum Reach from Wall

Subject stands erect with heels, buttocks, shoulder blades and head in contact with a vertical surface. The right arm is extended forward horizontally, elbow locked, hand flattened and extended forward - the distance from the vertical surface to the tip of the 3rd digit.

USAFLY.MEN	34.59	1.63	30.9	31.9	34.6	37.3	38.5
n = 4000	87.86	4.15	78.6	81.1	87.8	94.8	97.9

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

AXILLARY ARM CIRCUMFERENCE - see also Biceps Circumference,
Extended and Scye Circumference

Subject stands (Typ), right arm extended with the hand about 30 cm (12 in) from the body - the circumference of the arm, perpendicular to its long axis, as high in the axilla as possible.

USAFLY.MEN	12.50	1.03	10.4	10.9	12.4	14.3	15.0
n = 4000	31.74	2.62	26.3	27.6	31.6	36.3	38.1
USAF.WOM	10.80	.92	9.0	9.4	10.7	12.4	13.2
n = 1905	27.44	2.34	22.8	23.9	27.3	31.5	33.6
USAFLY.WOM	10.67	.69	9.2	9.5	10.7	11.7	12.2
n = 455	27.11	1.74	23.3	24.1	27.2	29.8	31.0

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BACK CURVATURE LENGTH - see also Interscye Distance

Subject stands erect with hands on hips - the surface distance across the back between midaxillary points on each side, at the level of maximum anterior protrusion of the busts (females) nipples (men).

USAF.WOM	16.59	1.20	14.1	14.8	16.5	18.7	19.8
n = 1905	42.15	3.05	35.8	37.6	41.9	47.6	50.3
USAFLY.WOM	16.63	1.02	14.4	15.0	16.6	18.4	19.0
n = 455	42.25	2.60	36.5	38.1	42.1	46.7	48.3

BALL-OF-FOOT CIRCUMFERENCE - see also Instep Circumference and
Heel-Ankle Circumference

Subject stands with weight equally distributed on both feet - the circumference of the foot at the distal heads of metatarsals I and V.

USAF.MEN	9.92	.48	8.9	9.1	9.9	10.7	11.1
n = 1236	25.20	1.23	22.6	23.2	25.2	27.3	28.3
USAFLY.MEN	9.78	.48	8.7	9.0	9.8	10.6	11.0
n = 2420	24.84	1.23	22.1	22.9	24.8	27.0	28.0

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

BIACROMIAL BREADTH - see also Bideltoid Breadth

Subject sits erect, head in the Frankfort plane, arms hanging relaxed, elbows flexed to about 90 degrees, and fore-arms and hands extended forward horizontally - the horizontal distance between the right and left Acromiale.

USAF.MEN	15.78	.74	14.0	14.6	15.8	17.0	17.5
n = 1236	40.09	1.88	35.5	37.0	40.1	43.1	44.4
USAFLY.MEN	16.04	.76	14.2	14.8	16.1	17.3	17.8
n = 2420	40.73	1.94	36.0	37.5	40.8	43.8	45.3
USAF.WOM	14.11	.65	12.6	13.1	14.1	15.2	15.7
n = 1905	35.84	1.64	31.9	33.2	35.8	38.6	39.8
USAFLY.WOM	14.34	.63	12.8	13.3	14.3	15.4	15.8
n = 455	36.43	1.59	32.6	33.8	36.4	39.0	40.2

BIAURICULAR BREADTH - see Ear-to-Ear Breadth

BICEPS CIRCUMFERENCE, EXTENDED - see also Biceps Circumference, Flexed; Axillary Arm Circumference and Scye Circumference

Subject stands (Typ), right arm extended downward with the hand about 30 cm (12 in) from the side of the body - the circumference of the arm at the point where Biceps Circumference, Flexed (q.v.) is measured.

USAF.MEN	11.52	.96	9.4	10.0	11.5	13.1	13.9
n = 1236	29.26	2.43	24.0	25.3	29.2	33.4	35.3
USAFLY.MEN	12.12	.92	10.0	10.6	12.1	13.7	14.4
n = 2420	30.79	2.34	25.5	27.0	30.8	34.7	36.7
USAF.WOM	10.08	.90	8.3	8.8	10.0	11.7	12.5
n = 1905	25.61	2.29	21.1	22.2	25.4	29.7	31.8
USAFLY.WOM	9.93	.65	8.4	8.8	10.0	10.9	11.3
n = 455	25.22	1.66	21.4	22.4	25.3	27.8	28.7

BICEPS CIRCUMFERENCE, FLEXED - see also Biceps Circumference, Extended

Subject stands (Typ), flexes right elbow to a right angle and makes a fist while holding the (upper) arm horizontally out to the side - the circumference of the arm at the maximum bulge of the biceps muscle.

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN	12.78	1.00	10.6	11.1	12.8	14.4	15.2
n = 1236	32.47	2.54	26.8	28.3	32.5	36.7	38.7
USAFLY.MEN	12.89	.89	10.9	11.5	12.9	14.4	15.1
n = 2420	32.74	2.26	27.6	29.1	32.7	36.6	38.3
USAF.WOM	10.55	.91	8.8	9.2	10.5	12.1	13.1
n = 1905	26.79	2.32	22.2	23.3	26.6	30.8	33.2
USAFLY.WOM	10.42	.66	8.8	9.3	10.4	11.5	11.8
n = 455	26.47	1.68	22.4	23.6	26.5	29.1	29.9

BICEPS CIRCUMFERENCE, RELAXED - see Biceps Circumference, Extended

BICRISTALE BREADTH - see Bi-iliocristale Breadth

BIDELTOID BREADTH - see also Biacromial Breadth

Subject sits erect, head in the Frankfort plane, arms hanging relaxed, elbow flexed to about 90 degrees, forearms and hands extended forward horizontally - the horizontal distance between the maximum lateral protrusions of the right and left deltoid muscles.

USAF.MEN	18.69	.98	16.6	17.1	18.7	20.4	21.1
n = 1236	47.46	2.49	42.2	43.5	47.4	51.7	53.7
USAFLY.MEN	18.99	1.01	16.7	17.4	19.0	20.7	21.4
n = 2420	48.24	2.56	42.4	44.1	48.2	52.6	54.4
USAF.WOM	16.48	.91	14.4	15.0	16.4	18.1	18.9
n = 1905	41.87	2.31	36.7	38.2	41.8	45.9	48.0
USAFLY.WOM	16.52	.74	14.4	15.3	16.5	17.7	18.1
n = 455	41.97	1.89	36.7	38.8	42.0	45.0	46.1

BIGONIAL BREADTH

Subject sits (Typ), mouth closed, upper and lower teeth in contact, but not clenched - the maximum horizontal breadth of the jaw across the gonial angles, using light contact.

USAF.MEN	4.29	.21	3.8	3.9	4.3	4.6	4.8
n = 1236	10.90	.54	9.6	10.0	10.9	11.8	12.2
USAFLY.MEN	4.62	.27	4.0	4.2	4.6	5.1	5.3
n = 2420	11.73	.69	10.2	10.6	11.7	12.9	13.4

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.WOM	4.01	.22	3.5	3.6	4.0	4.4	4.6
n = 1905	10.19	.56	8.9	9.3	10.2	11.1	11.6
USAFLY.WOM	4.02	.21	3.5	3.7	4.0	4.4	4.5
n = 455	10.21	.54	8.9	9.3	10.2	11.1	11.5

BI-ILIOCRISTALE BREADTH - see also Hip Breadth, Standing

Subject stands erect - the horizontal distance between the lateral aspects of the crests of the right and left ilia at the mid-axillary line. Strong pressure is exerted to approximate a bone-to-bone dimension.

USAF.MEN	12.18	1.02	10.2	10.6	12.1	13.9	14.8
n = 1236	30.93	2.58	25.8	27.0	30.8	35.4	37.7
USAFLY.MEN	10.99	.80	8.9	9.6	11.0	12.3	12.9
n = 2420	27.92	2.04	22.6	24.4	28.0	31.2	32.9

BIMALLEOLAR BREADTH

Subject stands - the horizontal distance between the maximum protrusions of the medial and lateral malleoli of the ankle.

USAF.MEN	2.94	.16	2.6	2.7	3.0	3.2	3.3
n = 1236	7.47	.41	6.5	6.8	7.5	8.1	8.5
USAFLY.MEN	2.89	.15	2.6	2.6	2.9	3.1	3.3
n = 2420	7.33	.38	6.5	6.7	7.3	8.0	8.3

BIOCLULAR BREADTH - see also Interocular Distance and Interpupillary Distance

Subject sits (Typ) - the distance between the outer corners (external canthi) of the eyes.

USAF.MEN	3.82	.19	3.4	3.5	3.8	4.1	4.3
n = 1236	9.71	.48	8.7	8.9	9.7	10.5	10.9
USAFLY.MEN	3.61	.19	3.2	3.3	3.6	3.9	4.1
n = 2420	9.17	.49	8.1	8.4	9.2	10.0	10.4
USAF.WOM	3.81	.19	3.3	3.5	3.8	4.1	4.3
n = 1905	9.67	.49	8.5	8.9	9.7	10.5	10.8
USAFLY.WOM	3.84	.19	3.4	3.5	3.8	4.2	4.3
n = 455	9.75	.47	8.7	9.0	9.7	10.6	10.9

BITRAGION BREADTH - see also Head Breadth

Subject sits (Typ) - the straight-line distance across the skull, from right to left Tragon.
(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN n = 1236	5.60 14.23	.24 .62	5.1 12.9	5.2 13.2	5.6 14.2	6.0 15.3	6.1 15.6
USAFLY.MEN n = 2420	5.61 14.25	.22 .56	5.1 13.0	5.3 13.4	5.6 14.3	6.0 15.2	6.1 15.6
USAF.WOM n = 1905	5.07 12.89	.20 .50	4.6 11.8	4.8 12.1	5.1 12.9	5.4 13.7	5.6 14.2
USAFLY.WOM n = 455	5.10 12.96	.19 .47	4.7 11.9	4.8 12.2	5.1 12.9	5.4 13.8	5.6 14.1

BITRAGION-CORONAL ARC

Subject sits (Typ) - the surface distance vertically over the top of the head, from right to left Tragion.

USAF.MEN n = 1236	14.00 35.56	.56 1.41	12.8 32.4	13.1 33.3	14.0 35.5	15.0 38.0	15.4 39.0
USAFLY.MEN n = 2420	14.08 35.76	.50 1.26	12.9 32.8	13.3 33.7	14.1 35.8	14.9 37.9	15.3 38.8
USAF.WOM n = 1905	13.35 33.92	.55 1.40	12.1 30.8	12.5 31.7	13.3 33.9	14.3 36.3	14.7 37.5
USAFLY.WOM n = 455	13.46 34.18	.56 1.42	12.2 31.0	12.6 32.0	13.4 34.1	14.4 36.7	14.8 37.6

BITRAGION-CRINION ARC - see also Bitragion-Minimum Frontal Arc

Subject sits (Typ) - the surface distance along the arc from right to left Tragion passing over the midpoint of the hair-line in the center of the forehead. (If there is obvious balding, this dimension is omitted.)

USAFLY.MEN n = 3437	13.04 33.13	.51 1.29	11.9 30.2	12.2 31.0	13.0 33.1	13.9 35.3	14.2 36.0
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BITRAGION-INION ARC - see also Bitragion-Posterior Arc

Subject sits (Typ) - the surface distance along the arc from right to left Tragion, passing over Inion.

USAFLY.MEN n = 2420	11.59 29.45	.59 1.49	10.4 26.4	10.7 27.2	11.5 29.3	12.6 32.1	13.1 33.3
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BITRAGION-MENTON ARC

Subject sits (Typ) - the surface distance along the arc from right to left Tragion, passing over Menton.

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN	12.64	.53	11.4	11.8	12.6	13.5	13.9
n = 1236	32.10	1.34	29.0	30.0	32.1	34.4	35.2
USAFLY.MEN	12.85	.49	11.8	12.1	12.8	13.7	14.0
n = 2420	32.65	1.24	29.9	30.6	32.6	34.7	35.4

BITRAGION-MINIMUM FRONTAL ARC - see also Bitracion-Crinion Arc

Subject sits (Typ) - the surface distance along the arc from right to left Tracion, passing across the forehead just above, but not including the brow ridges.

USAF.MEN	12.10	.43	11.1	11.4	12.1	12.8	13.2
n = 1236	30.74	1.10	28.3	29.0	30.7	32.6	33.5
USAFLY.MEN	12.13	.39	11.2	11.5	12.1	12.8	13.1
n = 2420	30.81	1.00	28.5	29.2	30.8	32.5	33.2

BITRAGION-POSTERIOR ARC - see also Bitracion-Inion Arc

Subject sits (Typ) - the surface distance along the arc from right to left Tracion, passing over the lowest point on the posterior aspect of the skull which can be palpated among the neck muscles.

USAF.MEN	10.43	.48	9.4	9.6	10.4	11.2	11.6
n = 1236	26.50	1.21	23.9	24.5	26.5	28.5	29.5

BITRAGION-SUBMANDIBULAR ARC

Subject sits (Typ) - the surface distance along the arc from right to left Tracion, passing under the chin and over the gonial angles of the jaw.

USAF.MEN	11.97	.62	10.6	10.9	12.0	13.0	13.5
n = 1236	30.41	1.57	26.9	27.8	30.4	33.0	34.3
USAFLY.MEN	12.20	.62	10.8	11.2	12.2	13.2	34.7
n = 2420	30.98	1.58	27.5	28.4	31.0	33.6	34.8

BITRAGION-SUBNASALE ARC

Subject sits (Typ) - the surface distance along the arc from right to left Tracion, passing across the face just below the nose.

USAF.MEN	11.44	.45	10.4	10.7	11.4	12.2	12.6
n = 1236	29.05	1.15	26.5	27.2	29.0	31.0	31.9
USAFLY.MEN	11.54	.40	10.6	10.9	11.5	12.2	12.5
n = 2420	29.31	1.02	27.0	27.6	29.3	31.0	31.7

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

BITROCHANTERIC BREADTH - see also Hip Breadth and Biiliocristale Breadth

Subject stands erect, feet together - the horizontal distance across the hips between the right and left trochanters of the humerus. The tissue overlying the trochanters is compressed firmly with the measuring instrument (beam caliper) so as to obtain a bone-to-bone approximation.

USAF.MEN	13.06	.69	11.5	12.0	13.0	14.2	14.8
n = 1236	33.17	1.76	29.3	30.4	33.1	36.1	37.6

BIZYGOMATIC BREADTH

Subject sits (Typ) - the straight-line maximum horizontal breadth of the face across the zygomatic arches.

USAF.MEN	5.59	.21	5.1	5.2	5.6	5.9	6.1
n = 1236	14.21	.54	13.0	13.3	14.2	15.1	15.5

USAFLY.MEN	5.60	.20	5.1	5.3	5.6	5.9	6.1
n = 2420	14.23	.52	13.0	13.4	14.2	15.1	15.5

USAF.WOM	5.08	.23	4.5	4.7	5.1	5.4	5.6
N = 1905	12.90	.58	11.4	11.9	12.9	13.8	14.2

USAFLY.WOM	5.10	.22	4.5	4.7	5.1	5.4	5.6
n = 455	12.96	.56	11.4	12.0	13.0	13.8	14.2

BUST CIRCUMFERENCE - see also Chest Circumference and Chest Circumference Below Bust

Subject (female) stands erect - the maximum circumference of the torso at the level of the maximum forward protrusion of the busts during quiet breathing.

USAF.WOM	35.33	2.24	31.0	32.1	35.0	39.4	42.0
n = 1905	89.73	5.70	78.7	81.6	89.0	100.2	106.6

USAFLY.WOM	35.19	1.59	31.4	32.6	35.2	37.8	39.1
n = 455	89.39	4.04	79.8	82.7	89.4	96.1	99.4

BUST DEPTH - see also Chest Depth

Subject (female) stands erect - the maximum horizontal depth of the torso at the level of the maximum forward protrusion of the busts, during quiet breathing.

USAF.WOM	9.31	.76	7.8	8.2	9.2	10.7	11.4
n = 1905	23.64	1.93	19.9	20.9	23.4	27.2	29.0

USAFLY.WOM	9.25	.60	8.0	8.2	9.3	10.3	10.7
n = 455	23.49	1.53	20.2	20.9	23.5	26.1	27.2

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

BUSTPOINT-TO-BUSTPOINT BREADTH

Subject (female) stands erect - the horizontal distance between the points of maximum forward protrusion of the busts.

USAF.WOM	7.30	.61	5.9	6.3	7.3	8.3	8.9
n = 1905	18.53	1.55	15.0	16.1	18.5	21.2	22.5
USAFLY.WOM	7.27	.54	6.0	6.4	7.2	8.2	8.5
n = 455	18.47	1.36	15.2	16.2	18.4	20.8	21.7

BUSTPOINT HEIGHT, STANDING - see also Nipple Height, Standing

Subject (female) stands erect - the vertical distance from the floor to the point of maximum forward protrusion of the right bust.

USAF.WOM	46.58	2.05	42.0	43.3	46.5	50.1	51.6
n = 1905	118.32	5.21	106.8	110.0	118.1	127.3	131.1
USAFLY.WOM	48.57	1.52	45.5	46.3	48.5	51.3	52.9
n = 455	123.37	3.86	115.6	117.5	123.1	130.4	134.4

BUTTOCK CIRCUMFERENCE, SITTING - see Hip Circumference, Sitting

BUTTOCK CIRCUMFERENCE, STANDING - see Hip Circumference, Standing

BUTTOCK CIRCUMFERENCE OVER FOUNDATION GARMENT, SITTING - see Hip Circumference over Foundation Garment, Sitting

BUTTOCK DEPTH, STANDING - see Hip Depth, Standing

BUTTOCK DEPTH OVER FOUNDATION GARMENT, STANDING - see Hip Depth over Foundation Garment, Standing

BUTTOCK HEIGHT, STANDING - see also Gluteal Furrow Height, Iliocristale Height and Trochanterion Height

Subject stands erect - the vertical distance from the standing surface to the level of maximum rearward protrusion of the buttocks.

USAF.MEN	35.63	1.83	31.5	32.6	35.6	38.7	40.1
n = 1236	90.51	4.65	79.9	82.9	90.5	98.2	101.8
USAFLY.MEN	35.48	1.73	31.6	32.7	35.4	38.4	39.7
n = 2420	90.11	4.39	80.2	83.1	90.0	97.5	100.9
USAF.WOM	32.37	1.64	28.9	29.7	32.3	35.1	36.3
n = 1905	82.21	4.16	73.3	75.4	82.1	89.2	92.1

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAFLY.WOM	33.61	1.31	30.7	31.6	33.5	35.9	37.4
n = 455	85.38	3.32	78.0	80.3	85.1	91.3	94.9

BUTTOCK-HEEL LENGTH - see also Buttock-Knee Length

Subject sits erect on a table, buttocks and lower back against a wall and the right leg extended as far as possible on the table, foot flexed as much as possible (the left leg is allowed to hang, but supported, over the edge of the table) - the distance from the wall (right buttock) to the base of the right heel.

USAFLY.MEN	42.70	2.02	38.3	39.4	42.7	46.1	47.7
n = 4000	108.46	5.14	97.2	100.2	108.4	117.0	121.1

BUTTOCK-KNEE LENGTH - see also Buttock-Heel Length and Buttock-Popliteal Length

Subject sits erect, feet resting on a surface adjusted so that the knees are flexed to about right angles and thighs horizontal - the horizontal distance from the rearmost surface of the right buttock to the forward surface of the kneecap (or tibial tuberosity).

USAF.MEN	23.83	1.10	21.3	22.0	23.8	25.7	26.6
n = 1236	60.53	2.80	54.1	56.0	60.5	65.2	67.5
USAFLY.MEN	23.78	1.06	21.4	22.1	23.8	25.6	26.5
n = 2420	60.40	2.70	54.3	56.1	60.3	65.0	67.3
USAF.WOM	22.61	1.04	20.4	21.0	22.6	24.4	25.1
n = 1905	57.43	2.63	51.8	53.2	57.3	61.9	63.7
USAFLY.WOM	23.18	.80	21.5	21.9	23.1	24.6	25.1
n = 455	58.89	2.04	54.6	55.7	58.7	62.5	63.8

BUTTOCK-LEG LENGTH - see Buttock-Heel Length

BUTTOCK-POPLITEAL LENGTH - see also Buttock-Knee Length

Subject sits erect on a table, feet resting on a surface adjusted so that the knees are bent at about right angles and thighs horizontal, the backs of the calves in contact with the edge of the table - the horizontal distance from the most posterior protrusion of the right buttock to the juncture of the underside of the right thigh and the back of the leg (the forward edge of the table).

USAF.MEN	19.61	1.04	17.2	18.0	19.6	21.4	22.3
n = 1236	49.82	2.64	43.6	45.6	49.8	54.3	56.7

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN	19.83	1.02	17.6	18.2	19.8	21.5	22.3
n = 2420	50.37	2.58	44.6	46.1	50.4	54.6	56.6
USAF.WOM	18.78	1.09	16.5	17.1	18.7	20.7	21.6
n = 1905	47.71	2.76	42.0	43.5	47.5	52.6	55.0
USAF.MEN	19.27	.95	17.3	17.8	19.2	20.9	21.8
n = 455	48.94	2.42	44.0	45.2	48.8	53.2	55.4

-C-D-E-

-C-D-E-

-C-D-E-

CALF CIRCUMFERENCE, STANDING

Subject stands with legs slightly apart - the maximum circumference of the right leg in the calf region, perpendicular to its long axis.

USAF.MEN	14.49	1.00	12.3	12.9	14.5	16.1	16.8
n = 1236	36.81	2.53	31.2	32.7	36.8	41.0	42.7
USAF.MEN	14.64	.89	12.6	13.2	14.6	16.1	16.8
n = 2420	37.19	2.27	32.0	33.5	37.2	41.0	42.6
USAF.WOM	13.44	.89	11.6	12.0	13.4	14.9	15.6
n = 1905	34.14	2.25	29.4	30.6	34.1	37.9	39.7
USAF.MEN	13.53	.75	11.9	12.3	13.5	14.8	15.2
n = 455	34.36	1.90	30.3	31.2	34.4	37.5	38.7

CALF HEIGHT

Subject stands erect - the vertical distance from the standing surface to the level of maximum circumference of the right calf.

USAF.MEN	14.36	.94	12.4	12.9	14.3	16.0	16.7
n = 1236	36.48	2.38	31.4	32.7	36.4	40.6	42.4
USAF.MEN	14.00	.87	12.1	12.6	14.0	15.5	16.0
N = 2420	35.55	2.22	30.7	32.0	35.5	39.3	40.7

CERVICAL HEIGHT, STANDING

Subject stands erect - the vertical distance from the standing surface to Cervicale.

USAF.MEN	59.23	2.49	53.4	55.2	59.2	63.4	65.3
n = 1236	150.44	6.32	135.7	140.2	150.4	161.1	165.9

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAFLY.MEN n = 2420	59.87 152.06	2.29 5.82	54.4 138.2	56.1 142.5	59.8 152.0	63.7 161.8	65.4 166.0
USAF.WOM n = 1905	54.80 139.20	2.17 5.52	50.2 127.6	51.3 130.3	54.8 139.1	58.4 148.4	60.0 152.5
USAFLY.WOM n = 455	57.00 144.77	1.44 3.65	54.4 138.3	54.9 139.4	56.9 144.4	59.6 151.5	61.2 155.4

CHEST BREADTH - see also Chest Breadth, Bone

Subject stands erect, arms slightly abducted - the horizontal distance across the thorax at the level of the nipples (men) or most anterior protrusion of the bust (women).

USAF.MEN n = 1236	12.69 32.24	.89 2.26	10.7 27.3	11.3 28.8	12.6 32.1	14.3 36.2	15.0 38.2
USAFLY.MEN n = 2420	12.91 32.78	.83 2.12	11.1 28.3	11.6 29.5	12.9 32.7	14.4 36.5	15.1 38.4
USAF.WOM n = 1905	11.02 27.99	.75 1.91	9.4 24.0	9.9 25.1	11.0 27.8	12.4 31.4	13.1 33.2
USAFLY.WOM n = 455	11.06 28.08	.60 1.52	9.6 24.3	10.1 25.6	11.0 28.0	12.1 30.7	12.5 31.7

CHEST BREADTH, BONE - see also Chest Breadth

Subject stands erect, arms slightly abducted - the horizontal distance across the thorax at the level of the nipples. The tissue overlying the rib cage is compressed with the measuring instrument to obtain an approximation of a costal dimension.

USAF.MEN n = 1236	11.78 29.92	.78 1.99	10.0 25.5	10.5 26.7	11.7 29.8	13.1 33.3	13.7 34.9
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CHEST CIRCUMFERENCE - see also Chest Circumference at Scye and Bust Circumference

Subject stands erect, arms initially raised, then lowered after measuring tape is in place - the maximum horizontal circumference of the chest at the level of the nipples during normal breathing.

USAF.MEN n = 1236	38.47 97.71	2.64 6.70	33.0 83.7	34.3 87.1	38.3 97.4	43.0 109.2	45.1 114.6
USAFLY.MEN n = 2420	38.80 98.55	2.50 6.35	33.4 84.8	34.9 88.6	38.7 98.3	43.1 109.4	45.0 114.4

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

CHEST CIRCUMFERENCE AT SCYE - see also Chest Circumference below
Bust and Bust Circumference

Subject stands erect, arms initially raised, then lowered after the tape is in place - the maximum horizontal circumference of the chest at the level of the arm scye during normal breathing.

USAFLY.MEN	40.26	2.39	34.9	36.4	40.2	44.3	46.1
n = 2420	102.26	6.07	88.6	92.5	102.1	112.4	117.0
USAF.WOM	33.17	1.95	29.3	30.3	33.0	36.7	38.9
n = 1905	84.25	4.96	74.3	77.0	83.7	93.2	98.8
USAFLY.WOM	33.19	1.46	29.6	30.8	33.1	35.7	36.7
n = 455	84.31	3.71	75.1	78.3	84.2	90.6	93.3

CHEST CIRCUMFERENCE BELOW BUST - see also Chest Circumference at
Scye and Bust Circumference

Subject stands erect, arms slightly abducted to permit clearance of the measuring tape - the maximum horizontal circumference of the torso at the level just below the cups of the bra, during quiet breathing.

USAF.WOM	29.26	1.92	25.6	26.5	29.1	32.7	34.9
n = 1905	74.33	4.87	65.0	67.2	73.8	83.1	88.5
USAFLY.WOM	29.24	1.41	26.1	26.9	29.3	31.6	32.6
n = 455	74.28	3.58	66.3	68.3	74.3	80.3	82.9

CHEST DEPTH - see also Bust Depth

Subject stands erect - the maximum horizontal depth of the torso at the level of the nipples during quiet breathing.

USAF.MEN	9.39	.86	7.6	8.0	9.4	10.8	11.5
n = 1236	23.86	2.19	19.2	20.4	23.8	27.5	29.2
USAFLY.MEN	9.65	.76	8.0	8.4	9.6	10.9	11.5
n = 2420	24.52	1.93	20.3	21.3	24.5	27.7	29.2

CHEST HEIGHT, STANDING - see Nipple Height, Standing and
Bustpoint Height, Standing

CHIN PROJECTION - see Menton Projection

CHIN-TO-BACK OF HEAD - see Menton-to-Back of Head

CHIN-TO-HAIRLINE - see Menton-to-Crinion Length

CHIN-TO-TOP OF HEAD - see Menton-to-Top of Head

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

CHIN-TO-NASAL ROOT DEPRESSION - see Menton-Nasal Root Depression Length

CHIN-TO-WALL - see Menton-to-Back of Head

CHIN PROMINENCE-TO-WALL - see Menton-to-Back of Head

CRISTALE HEIGHT - see Iliocristale Height

CROTCH HEIGHT - see also Gluteal Furrow Height and Penale Height
Subject stands erect, feet approximately eight inches apart - the distance from the floor to the midpoint of the crotch between the genitalia and the right thigh.

USAF.MEN	32.40	1.71	28.4	29.6	32.4	35.3	36.5
n = 1236	82.29	4.35	72.2	75.3	82.2	89.6	92.7
USAFLY.MEN	33.49	1.63	29.8	30.8	33.5	36.2	37.4
n = 2420	85.07	4.15	75.6	78.3	85.0	92.0	94.9
USAF.WOM	29.33	1.59	25.9	26.8	29.3	32.0	33.2
n = 1905	74.50	4.03	65.8	68.1	74.4	81.4	84.3
USAFLY.WOM	30.53	1.28	27.8	28.6	30.4	32.8	34.3
n = 455	77.54	3.26	70.7	72.6	77.3	83.4	87.0

CROTCH LENGTH

Subject stands, legs slightly apart - the surface distance through the crotch and over the middle of the right buttock from the level of the umbilicus to the waist level on the back above the middle of the right buttock.

USAF.MEN	27.18	1.90	23.1	24.2	27.1	30.4	31.7
n = 1236	69.03	4.83	58.6	61.4	68.8	77.3	80.6
USAFLY.MEN	27.80	1.74	24.1	25.1	27.7	30.8	32.2
n = 2420	70.61	4.43	61.3	63.6	70.4	78.2	81.7

DACTYLION HEIGHT - see also Metacarpale III Height

Subject stands erect with arms hanging at the sides, elbows fully extended and fingers pointing to the standing surface - the vertical distance from the standing surface to the tip of the right middle finger.

USAF.MEN	26.09	1.44	22.8	23.7	26.1	28.5	29.8
n = 1236	66.27	3.66	57.8	60.3	66.2	72.4	75.6
USAFLY.MEN	26.45	1.38	23.2	24.2	26.4	28.8	29.8
n = 2420	67.18	3.51	58.9	61.5	67.1	73.2	75.6

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

DELTOID ARC

Subject stands erect, arms hanging naturally at sides - the surface distance from the right acromion to the insertion of the deltoid muscle onto the humerus.

USAF.MEN	6.05	.49	5.0	5.3	6.0	6.9	7.3
n = 1236	15.37	1.24	12.8	13.5	15.3	17.5	18.5
USAFLY.MEN	6.26	.52	5.2	5.5	6.2	7.2	7.7
n = 2420	15.91	1.33	13.2	13.9	15.8	18.3	19.7

EAR BREADTH

Subject sits (Typ) - the maximum breadth of the ear perpendicular to its long axis.

USAF.MEN	1.44	.12	1.1	1.3	1.5	1.7	1.7
n = 1236	3.66	.30	2.9	3.2	3.7	4.2	4.4
USAFLY.MEN	1.50	.12	1.2	1.3	1.5	1.7	1.8
n = 2420	3.80	.30	3.1	3.3	3.8	4.3	4.6
USAF.WOM	1.17	.13	.8	.9	1.2	1.4	1.5
n = 1905	2.98	.33	2.1	2.4	3.0	3.5	3.7
USAFLY.WOM	1.19	.13	.9	.9	1.2	1.4	1.5
n = 455	3.01	.33	2.2	2.4	3.0	3.5	3.7

EAR LENGTH - see also Ear Length above Tragion

Subject sits (Typ) - the maximum length of the right ear parallel to its long axis.

USAF.MEN	2.59	.18	2.2	2.3	2.6	2.9	3.0
n = 1236	6.58	.45	5.6	5.9	6.6	7.3	7.7
USAFLY.MEN	2.60	.17	2.2	2.3	2.6	2.9	3.0
n = 2420	6.60	.43	5.6	5.9	6.6	7.3	7.7
USAF.WOM	2.06	.17	1.6	1.8	2.1	2.3	2.5
n = 1905	5.24	.44	4.2	4.5	5.2	6.0	6.3
USAFLY.WOM	2.08	.17	1.7	1.8	2.1	2.3	2.4
n = 455	5.28	.44	4.2	4.5	5.3	5.9	6.2

EAR LENGTH ABOVE TRAGION - see also Ear Length

Subject sits (Typ) - the vertical distance from Tragion to the top of the ear parallel to its long axis.

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN n = 1236	1.17 2.98	.11 .29	.9 2.3	1.0 2.5	1.2 3.0	1.3 3.4	1.4 3.6
USAFLY.MEN n = 2420	1.16 2.94	.11 .29	.9 2.3	1.0 2.5	1.1 2.9	1.4 3.5	1.5 3.7

EAR PROTRUSION

Subject sits (Typ) - the maximum protrusion of the ear, measured at a right angle to the surface of the head at the mastoid process.

USAF.MEN n = 1236	.87 2.22	.13 .33	.6 1.5	.7 1.7	.9 2.2	1.1 2.8	1.2 3.0
USAFLY.MEN n = 2420	.85 2.16	.13 .34	.6 1.4	.6 1.7	.8 2.1	1.1 2.8	1.2 3.0

EAR-TO-EAR

Subject sits (Typ) - the maximum horizontal distance between the most lateral points on the right and left ears.

USAF.MEN n = 1236	7.38 18.74	.33 .84	6.6 16.7	6.9 17.4	7.4 18.7	7.9 20.1	8.1 20.7
USAFLY.MEN n = 2420	7.41 18.83	.32 .81	6.7 17.0	6.9 17.5	7.4 18.8	8.0 20.2	8.2 20.8
USAF.WOM n = 1905	6.23 15.83	.37 .95	5.5 13.9	5.6 14.2	6.2 15.8	6.8 17.4	7.1 18.0
USAFLY.WOM n = 455	6.28 15.96	.37 .93	5.5 14.0	5.7 14.4	6.3 15.9	6.9 17.5	7.1 18.1

ECTOANTHUS-TO-BACK OF HEAD - see also Ectocanthus-to-Top of Head

Subject stands (Typ), head oriented in the Frankfort plane - the horizontal distance from Ectocanthus to the back of the head.

USAF.MEN n = 1236	6.92 17.58	.27 .68	6.3 16.0	6.5 16.5	6.9 17.6	7.4 18.7	7.6 19.3
USAFLY.MEN n = 2420	7.00 17.79	.26 .66	6.4 16.2	6.6 16.7	7.0 17.8	7.4 18.9	7.6 19.3
USAF.WOM n = 1905	6.44 16.37	.38 .97	5.7 14.4	5.9 14.9	6.4 16.3	7.1 18.1	7.5 19.1
USAFLY.WOM n = 455	6.51 16.54	.37 .93	5.8 14.7	5.9 15.1	6.5 16.5	7.2 18.2	7.5 19.1

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

ECTOCANTHUS-TO-TOP OF HEAD - see also Ectocanthus-to-Back of Head
Subject stands (Typ), head oriented in the Frankfort plane - the vertical distance from Ectocanthus to the top of the head (Vertex).

USAF.MEN	4.51	.29	3.8	4.1	4.5	5.0	5.2
n = 1236	11.45	.73	9.7	10.3	11.4	12.7	13.3
USAFLY.MEN	4.70	.30	4.0	4.2	4.7	5.2	5.4
n = 2420	11.95	.77	10.2	10.7	11.9	13.2	13.8
USAF.WOM	4.63	.36	3.9	4.1	4.6	5.3	5.6
n = 1905	11.76	.92	9.9	10.4	11.7	13.4	14.2
USAFLY.WOM	4.71	.35	4.0	4.2	4.7	5.3	5.6
n = 455	11.96	.89	10.1	10.6	11.9	13.5	14.2

ECTOCANTHUS-TO-VERTEX - see Ectocanthus-to-Top of Head

ECTOCANTHUS-TO-WALL - see Ectocanthus-to-Back of Head

ELBOW BREADTH, BONE

Subject flexes right elbow to 90 degrees - the maximum breadth across the humeral epicondyles, with firm pressure to approximate a bony dimension.

USAF.MEN	2.84	.15	2.5	2.6	2.8	3.1	3.2
n = 1236	7.21	.39	6.3	6.6	7.2	7.9	8.1
USAFLY.MEN	2.79	.14	2.5	2.6	2.8	3.0	3.1
n = 2420	7.08	.36	6.2	6.5	7.1	7.7	7.9
USAF.WOM	2.41	.12	2.1	2.2	2.4	2.6	2.7
n = 1905	6.13	.31	5.4	5.6	6.1	6.7	6.9
USAFLY.WOM	2.46	.11	2.2	2.3	2.5	2.6	2.7
n = 455	6.26	.29	5.5	5.8	6.3	6.7	6.9

ELBOW CIRCUMFERENCE, EXTENDED - see also Elbow Circumference, Flexed

Subject stands (Typ), right elbow fully extended and arm at about 30 degrees from the side of the body - the circumference of the elbow perpendicular to the long axis of the arm passing over the tip of the olecranon process.

USAF.MEN	10.58	.60	9.3	9.6	10.6	11.6	12.1
n = 1236	26.88	1.53	23.7	24.4	26.8	29.5	30.7

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN	10.89	.56	9.7	10.0	10.9	11.9	12.3
n = 2420	27.67	1.43	24.6	25.4	27.6	30.1	31.1

ELBOW CIRCUMFERENCE, FLEXED - see also Elbow Circumference, Extended

Subject stands (Typ), right elbow flexed to about 90 degrees, arm elevated laterally to the horizontal position, and hand made into a fist - the circumference of the elbow over the tip of the olecranon process.

USAF.MEN	12.45	.80	10.7	11.1	12.4	13.8	14.5
n = 1236	31.62	2.03	27.2	28.3	31.6	35.0	36.9
USAF.MEN	12.30	.69	10.8	11.2	12.3	13.5	14.0
n = 2420	31.24	1.75	27.4	28.5	31.2	34.2	35.6
USAF.WOM	10.62	.70	9.1	9.5	10.6	11.8	12.4
n = 1905	26.98	1.78	23.0	24.2	26.9	30.0	31.5
USAF.WOM	10.83	.61	9.5	9.8	10.8	11.9	12.1
n = 455	27.52	1.55	24.1	25.0	27.5	30.1	30.8

ELBOW CIRCUMFERENCE, RELAXED - see Elbow Circumference, Extended

ELBOW HEIGHT, STANDING - see also Elbow Rest Height

Subject stands erect, arms hanging naturally at sides - the vertical distance from the floor to the depression between the distal end of the humerus and the proximal end of the radius (Radiale), at the elbow of the right arm.

USAF.MEN	43.47	1.96	38.8	40.3	43.5	46.8	48.1
n = 1236	110.41	4.97	98.6	102.3	110.4	118.8	122.3
USAF.MEN	44.21	1.80	39.9	41.3	44.2	47.2	48.4
n = 2420	112.29	4.57	101.4	104.8	112.2	120.0	123.0

ELBOW REST HEIGHT - see also Elbow Height, Standing

Subject sits erect, (upper) arms hanging relaxed, forearms and hands extended forward and horizontal - the vertical distance from the sitting surface to the bottom of the right elbow.

USAF.MEN	9.44	1.07	7.0	7.7	9.4	11.3	12.1
n = 1236	23.98	2.71	17.8	19.6	23.9	28.6	30.7
USAF.MEN	9.91	1.03	7.5	8.2	9.9	11.6	12.4
n = 2420	25.16	2.61	19.1	20.9	25.1	29.5	31.5

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.WOM	8.94	.97	6.8	7.4	8.9	10.6	11.3
n = 1905	22.71	2.46	17.3	18.7	22.7	26.9	28.8
USAFLY.WOM	9.41	.89	7.5	8.0	9.4	10.9	11.5
n = 455	23.91	2.26	19.0	20.3	23.8	27.8	29.1

ELBOW-GRIP LENGTH - see also Forearm-Hand Length

Subject stands erect (Typ), right (upper) arm hanging relaxed, elbow flexed to 90 degrees, forearm extended forward and grasping a pencil vertically in the grip of the right hand - the horizontal distance from the back of the right elbow (olecranon process) to the axis of the pencil.

USAFLY.MEN	13.86	.64	12.5	12.8	13.9	14.9	15.4
n = 2420	35.20	1.62	31.7	32.6	35.2	37.9	39.1

ELBOW-TO-ELBOW BREADTH - see also Forearm-to-Forearm Breadth

Subject sits erect (Typ), (upper) arms hanging at sides, forearms and hands extended horizontally and forward - the maximum horizontal distance across the lateral surfaces of the elbows.

USAFLY.MEN	17.28	1.40	14.5	15.2	17.2	19.8	20.9
n = 4000	43.90	3.55	37.0	38.6	43.6	50.2	53.2

ELBOW-WRIST LENGTH - see also Radiale-Stylian Length

Subject stands erect (Typ), right arm hanging at the side, elbow flexed to 90 degrees, the forearm and hand extended forward horizontally, hand flattened - the distance from the tip of the right elbow to the wrist (Stylian).

USAF.MEN	11.36	.57	10.1	10.4	11.3	12.3	12.7
n = 1236	28.85	1.45	25.7	26.5	28.8	31.3	32.3
USAFLY.MEN	11.81	.56	10.5	10.9	11.8	12.7	13.1
n = 2420	29.99	1.41	26.7	27.7	30.0	32.4	33.4

EYE HEIGHT, SITTING - see also Eye Height, Standing

Subject sits erect, head in the Frankfort plane, (upper) arms hanging relaxed, forearms and hands extended forward horizontally - the vertical distance from the sitting surface to the right internal canthus (USAF.MEN) or external canthus (USAFLY.MEN, USAF.WOM, AND USAFLY.WOM).

USAF.MEN	31.37	1.33	28.0	29.2	31.3	33.5	34.4
n = 1236	79.67	3.37	71.2	74.2	79.6	85.2	87.5

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAFLY.MEN n = 2420	31.87 80.95	1.19 3.02	29.2 74.1	30.0 76.2	31.8 80.9	33.9 86.1	34.8 88.3
USAF.WOM n = 1905	29.02 73.70	1.20 3.06	26.3 66.9	27.1 68.7	29.0 73.7	31.0 78.8	31.9 81.1
USAFLY.WOM n = 455	30.19 76.69	.80 2.02	28.5 72.3	28.9 73.5	30.2 76.6	31.6 80.2	32.4 82.4

EYE HEIGHT, STANDING - see also Eye Height, Sitting

Subject stands erect, looking directly forward, head oriented in the Frankfort plane - the vertical distance from the floor to the internal canthus of the right eye.

USAFLY.MEN n = 4000	64.70 164.34	2.37 6.02	59.1 150.1	60.8 154.4	64.7 164.4	68.6 174.3	70.4 178.8
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EYE-TO-BACK OF HEAD - see Ectocanthus-to-Back of Head

EYE-TO-EYE DISTANCE - see Biocular Breadth and Interpupillary Distance

EYE-TO-TOP OF HEAD - see Ectocanthus-to-Top of Head

-F-G-

-F-G-

-F-G-

FACE BREADTH - see Bizygomatic Breadth

FACE LENGTH - see Menton-Nasal Root Depression Length

FEMORAL BREADTH - see Knee Breadth, Bone

FIBULA HEIGHT, STANDING - see also Knee Height, Standing

Subject stands erect - the vertical distance from the standing surface to the top of the right fibula.

USAFLY.MEN n = 2420	17.27 43.87	.89 2.25	15.3 38.8	15.8 40.2	17.3 43.8	18.7 47.6	19.4 49.4
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FINGER III DIAMETER

Subject inserts Finger III into a series of graduated holes - the diameter of the hole which most closely approximates the maximum diameter of the finger.

USAFLY.MEN n = 4000	.84 2.13	.05 .12	.7 1.9	.8 2.0	.9 2.2	.9 2.4	.9 2.4
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SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

FINGER III LENGTH - see First Phalanx Length, Digit III

FIRST PHALANX LENGTH, DIGIT III

Subject's right hand is made into a fist - the length of the first segment of the middle finger across the surfaces of the third metacarpal and the second phalanx.

USAFLY.MEN	2.67	.12	2.4	2.5	2.7	2.9	2.9
n = 4000	6.78	.30	6.1	6.3	6.8	7.3	7.5

FOOT BREADTH - see also Heel Breadth

Subject stands, weight equally distributed on both feet - the maximum breadth of the foot perpendicular to its longitudinal axis.

USAF.MEN	3.87	.20	3.4	3.5	3.9	4.2	4.3
n = 1236	9.82	.52	8.6	9.0	9.8	10.7	11.0
USAFLY.MEN	3.85	.20	3.4	3.5	3.8	4.2	4.5
n = 2420	9.77	.50	8.7	9.0	9.8	10.6	11.0
USAF.WOM	3.49	.20	3.0	3.2	3.5	3.8	4.0
n = 1905	8.87	.60	7.7	8.0	8.9	9.8	10.2
USAFLY.WOM	3.55	.19	3.1	3.2	3.5	3.9	4.0
n = 455	9.01	.47	7.8	8.2	9.0	9.9	10.2

FOOT CIRCUMFERENCE - see Ball-of-Foot Circumference

FOOT LENGTH - see also Instep Length

Subject stands, weight equally distributed on both feet - the maximum length of the foot to the longest toe, parallel to the longitudinal axis of the foot.

USAF.MEN	10.56	.49	9.4	9.8	10.6	11.4	11.7
n = 1236	26.81	1.24	24.0	24.8	26.8	28.9	29.8
USAFLY.MEN	10.64	.47	9.6	9.9	10.6	11.4	11.8
n = 2420	27.03	1.19	24.3	25.1	27.0	29.0	29.9
USAF.WOM	9.48	.44	8.5	8.7	9.5	10.2	10.6
n = 1905	24.07	1.13	21.5	22.2	24.1	26.0	26.8
USAFLY.WOM	9.76	.35	8.9	9.1	9.8	10.4	10.7
n = 455	24.79	.90	22.7	23.2	24.8	26.3	27.1

SOURCE	X	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

FOREARM CIRCUMFERENCE, EXTENDED - see also Forearm Circumference, Flexed

Subject stands (Typ), right elbow fully extended, hand relaxed and about 30 cm from the side of the body - the maximum circumference of the forearm perpendicular to its longitudinal axis.

USAF.MEN	10.93	.63	9.6	9.9	10.9	12.0	12.4
n = 1236	27.75	1.61	24.3	25.1	27.8	30.4	31.5
USAFLY.MEN	11.09	.57	9.8	10.2	11.1	12.1	12.5
n = 2420	28.16	1.46	24.9	25.8	28.1	30.6	31.7
USAF.WOM	9.24	.54	8.1	8.4	9.2	10.1	10.6
n = 1905	23.48	1.38	20.6	21.3	23.4	25.8	27.0
USAFLY.WOM	9.28	.43	8.3	8.5	9.3	10.0	10.3
n = 455	23.57	1.09	21.1	21.7	23.6	25.3	26.1

FOREARM CIRCUMFERENCE, FLEXED - see also Forearm Circumference, Extended

Subject stands (Typ), extends right arm forward, flexes elbow to about a right angle in the vertical plane and makes a tight fist - the maximum circumference of the forearm perpendicular to its longitudinal axis.

USAF.MEN	11.68	.72	10.1	10.5	11.7	12.9	13.3
n = 1236	29.67	1.83	25.6	26.7	29.7	32.7	33.8
USAFLY.MEN	11.72	.62	10.3	10.7	11.7	12.8	13.3
n = 2420	29.77	1.58	26.3	27.2	29.7	32.4	33.7
USAF.WOM	9.83	.60	8.6	8.9	9.8	10.8	11.4
n = 1905	24.98	1.52	21.7	22.6	24.9	27.5	28.9
USAFLY.WOM	9.89	.49	8.7	9.1	9.9	10.7	11.0
n = 455	25.11	1.24	22.1	23.0	25.1	27.1	28.0

FOREARM CIRCUMFERENCE, RELAXED - see Forearm Circumference, Extended

FOREARM-GRIP LENGTH - see Elbow-Grip Length

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

FOREARM-HAND LENGTH - see also Elbow-Grip Length

Subject stands erect (Typ), right arm hanging naturally at side, elbow flexed to 90 degrees, forearm and hand directed forward and horizontal, hands flat and palm inward - the distance from the tip of the right elbow to the tip of the longest finger.

USAF.MEN	18.85	.80	17.0	17.5	18.9	20.2	20.7
n = 4000	47.88	2.03	43.2	44.6	47.9	51.2	52.6

FOREARM-TO-FOREARM BREADTH - see also Elbow-to-Elbow Breadth

Subject sits erect (Typ), upper arms hanging relaxed, elbows flexed to 90 degrees and forearms and hands extended forward horizontally and flat - the distance between the lateral surfaces of the forearms.

USAF.MEN	19.46	1.69	15.8	16.8	19.4	22.4	23.9
n = 1236	49.43	4.28	40.2	42.6	49.3	56.8	60.6
USAF.MEN	21.39	1.49	18.0	19.0	21.4	23.9	24.9
n = 2420	54.32	3.78	45.8	48.2	54.2	60.7	63.3

FUNCTIONAL REACH - see Thumb-Tip Reach

FUNCTIONAL REACH, EXTENDED - see Thumb-Tip Reach, Extended

GLABELLA-TO-BACK OF HEAD - see also Head Length

Subject stands (Typ), head oriented in the Frankfort plane - the horizontal distance from Glabella to the back of the head.

USAF.MEN	7.86	.27	7.2	7.4	7.9	8.3	8.5
n = 1236	19.97	.69	18.3	18.8	20.0	21.1	21.6
USAF.MEN	8.01	.26	7.4	7.6	8.0	8.5	8.7
n = 2420	20.35	.67	18.8	19.3	20.3	21.5	22.0

GLABELLA-TO-TOP OF HEAD

Subject stands (Typ), head oriented in the Frankfort plane - the vertical distance from Glabella to the top of the head (Vertex).

USAF.MEN	3.55	.35	2.8	3.0	3.5	4.1	4.4
n = 1236	9.01	.89	7.0	7.6	9.0	10.5	11.1
USAF.MEN	3.65	.38	2.8	3.0	3.6	4.3	4.6
n = 2420	9.27	.97	7.2	7.7	9.3	10.9	11.7

GLABELLA-TO-VERTEX - see Glabella-to-Top of Head

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

GLABELLA-TO-WALL - see Glabella-to-Back of Head

GLUTEAL ARC

Subject stands - the vertical surface distance over the maximum protrusion of the right buttock from the gluteal furrow to the level of the waist (Umbilicus) in back.

USAFLY.MEN	11.63	.78	9.8	10.4	11.6	13.0	13.5
n = 4000	29.55	1.99	24.8	26.3	29.5	32.9	34.2

GLUTEAL FURROW HEIGHT - see also Buttock Height, Trochanterion Height and Crotch Height

Subject stands erect - the vertical distance from the standing surface to the lowest point in the right gluteal furrow.

USAF.MEN	31.65	1.69	27.8	29.0	31.6	34.5	35.7
n = 1236	80.38	4.28	70.6	73.6	80.2	87.7	90.6
USAFLY.MEN	31.93	1.58	28.2	29.4	31.9	34.6	35.7
n = 2420	81.11	4.01	71.7	74.6	81.0	87.9	90.8
USAF.WOM	28.62	1.56	25.3	26.2	28.6	31.3	32.4
n = 1905	72.70	3.96	64.2	66.4	72.6	79.4	82.2
USAFLY.WOM	29.82	1.30	26.9	27.7	29.8	32.1	33.4
n = 455	75.75	3.30	68.2	70.4	75.6	81.5	84.9

GRIP DIAMETER, INSIDE - see also Grip Diameter, Outside

Subject holds a cone at the largest circumference that he can grasp and encircle with his thumb and middle finger just touching - record the diameter of the cone where the thumb and middle finger touch.

USAFLY.MEN	1.87	.13	1.6	1.6	1.9	2.1	2.2
n = 4000	4.76	.33	4.1	4.2	4.8	5.2	5.6

GRIP DIAMETER, OUTSIDE - see also Grip Diameter, Inside

Subject holds a cone at the largest circumference that he can grasp and encircle with his thumb and middle finger just touching - the distance from the joint of the first and second phalanges of the thumb to the knuckle of the middle finger (metacarpal-first phalanx joint).

USAFLY.MEN	4.08	.22	3.5	3.7	4.1	4.4	4.6
n = 4000	10.36	.56	9.0	9.4	10.4	11.3	11.7

HAND BREADTH AT METACARPALE - see also Hand Breadth at Thumb

Right hand flattened, palm up, fingers extended and together - the maximum breadth of the hand from Metacarpale II to Metacarpale V.

USAF.MEN	3.50	.18	3.1	3.2	3.5	3.8	3.9
n = 1236	8.90	.45	7.9	8.2	8.9	9.6	9.9
USAFLY.MEN	3.50	.16	3.1	3.2	3.5	3.8	3.9
n = 2420	8.90	.41	8.0	8.2	8.9	9.6	9.9
USAF.WOM	2.97	.15	2.6	2.7	3.0	3.2	3.3
n = 1905	7.55	.39	6.7	6.9	7.6	8.2	8.5
USAFLY.WOM	3.02	.15	2.7	2.8	3.0	3.3	3.3
n = 455	7.68	.37	6.8	7.1	7.7	8.3	8.5

HAND BREADTH AT THUMB - see also Hand Breadth at Metacarpale

Right hand flattened, palm up, fingers extended and together, thumb in the plane of the hand and lightly touching the side of the hand - the breadth of the hand at Metacarpale I, (thumb) perpendicular to the long axis of the hand.

USAFLY.MEN	4.01	.20	3.6	3.7	4.0	4.3	4.5
n = 2420	10.19	.50	9.1	9.4	10.2	11.0	11.4

HAND CIRCUMFERENCE AT METACARPALE - see also Hand Circumference over Thumb

Right hand flattened, fingers extended and together - the circumference around the hand at the level of Metacarpale II and Metacarpale V.

USAF.MEN	8.50	.39	7.6	7.9	8.5	9.2	9.4
n = 1236	21.60	.99	19.3	20.0	21.6	23.3	23.9
USAFLY.MEN	8.48	.37	7.6	7.9	8.5	9.1	9.4
n = 2420	21.55	.94	19.4	20.0	21.5	23.1	23.8
USAF.WOM	7.21	.36	6.4	6.6	7.2	7.8	8.1
n = 1905	18.32	.91	16.3	16.8	18.3	19.8	20.6
USAFLY.WOM	7.31	.32	6.6	6.8	7.3	7.8	8.1
n = 455	18.57	.82	16.7	17.2	18.5	19.9	20.5

HAND CIRCUMFERENCE OVER THUMB - see also Hand Circumference at Metacarpale

Right hand flattened, fingers extended and together, thumb in the plane of the hand and lightly touching its side - the circumference of the hand at the level of Metacarpale I, perpendicular to the long axis of the hand.

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN	10.04	.47	9.0	9.3	10.0	10.8	11.1
n = 1236	25.50	1.19	22.8	23.6	25.5	27.5	28.3
USAFLY.MEN	10.14	.43	9.2	9.5	10.1	10.9	11.1
n = 2420	25.75	1.08	23.4	24.1	25.7	27.6	28.3

HAND LENGTH - see also Palm Length

Right hand extended, flattened, palm up, fingers extended and together - the distance from the proximal edge of the navicular bone in the wrist (USAF.MEN) or from the distal wrist crease (USAFLY.MEN, USAF.WOM and USAFLY.WOM) to the tip of the longest finger parallel to the long axis of the hand.

USAF.MEN	7.71	.36	6.9	7.1	7.7	8.3	8.6
n = 1236	19.59	.91	17.6	18.1	19.6	21.1	21.8
USAFLY.MEN	7.52	.32	6.8	7.0	7.5	8.1	8.3
n = 2420	19.11	.82	17.3	17.8	19.1	20.5	21.1
USAF.WOM	7.24	.38	6.4	6.7	7.2	7.9	8.2
n = 1905	18.38	.96	16.4	16.9	18.3	20.1	20.8
USAFLY.WOM	7.46	.34	6.7	6.9	7.4	8.0	8.2
n = 455	18.94	.86	17.0	17.6	18.9	20.4	20.9

HAND THICKNESS AT METACARPALE III

Right hand flattened, fingers extended and together - the thickness of the hand at the metacarpal-phalangeal joint of the third finger.

USAF.MEN	1.18	.08	1.0	1.1	1.2	1.3	1.4
n = 1236	2.99	.20	2.5	2.7	3.0	3.3	3.5
USAFLY.MEN	1.09	.08	.9	1.0	1.1	1.2	1.3
n = 2420	2.77	.21	2.2	2.4	2.8	3.1	3.3

HEAD BREADTH - see also Bitragion Breadth and Head Breadth, Maximum Frontal

Head erect - the maximum breadth of the head above the temples (the cranium) perpendicular to the midsagittal plane.

USAF.MEN	6.12	.21	5.6	5.8	6.1	6.5	6.6
n = 1236	15.54	.54	14.3	14.7	15.5	16.5	16.8
USAFLY.MEN	6.14	.21	5.7	5.8	6.1	6.5	6.7
n = 2420	15.60	.54	14.4	14.7	15.6	16.5	16.9

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.WOM	5.72	.23	5.1	5.3	5.7	6.1	6.3
n = 1905	14.52	.59	13.1	13.5	14.5	15.5	16.0
USAFLY.WOM	5.74	.23	5.2	5.4	5.7	6.1	6.3
n = 455	14.57	.58	13.1	13.6	14.6	15.5	15.9

HEAD BREADTH, MAXIMUM FRONTAL - see also Head Breadth and Bitragion Breadth

Subject sits (Typ) - the horizontal distance across the lateral bony margins of the brow ridges.

USAF.MEN	4.53	.19	4.1	4.2	4.5	4.8	5.0
n = 1236	11.50	.48	10.4	10.7	11.5	12.3	12.6
USAFLY.MEN	4.57	.18	4.1	4.3	4.6	4.9	5.0
n = 2420	11.60	.46	10.5	10.9	11.6	12.4	12.7

HEAD CIRCUMFERENCE

Subject sits (Typ), head erect - the maximum circumference of the head above, but not including the brow ridges.

USAF.MEN	22.48	.60	21.1	21.5	22.5	23.5	24.0
n = 1236	57.09	1.52	53.7	54.6	57.1	59.7	60.9
USAFLY.MEN	22.65	.56	21.4	21.7	22.6	23.6	24.0
n = 2420	57.52	1.43	54.4	55.2	57.5	59.9	61.0
USAF.WOM	21.60	.64	20.2	20.6	21.6	22.7	23.1
n = 1905	54.87	1.62	51.2	52.3	54.8	57.6	58.8
USAFLY.WOM	21.77	.60	20.4	20.8	21.7	22.8	23.3
n = 455	55.30	1.52	51.9	52.9	55.2	57.9	59.1

HEAD DIAGONAL, INION TO PRONASALE - see Head Diagonal, Maximum from Inion

HEAD DIAGONAL, MAXIMUM FROM CHIN - see Head Diagonal, Maximum from Menton

HEAD DIAGONAL, MAXIMUM FROM INION - see also Pronasale-to-Back of Head; Head Diagonal, Maximum from Nuchale and Head Length

Subject sits (Typ), head erect - the greatest straight-line distance from Inion to the most distant point on the face, usually the nose or chin.

USAFLY.MEN	8.64	.40	7.7	8.0	8.6	9.3	9.6
n = 2420	21.94	1.01	19.6	20.2	22.0	23.6	24.3

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

HEAD DIAGONAL, MAXIMUM FROM MENTON - see also Chin Prominence-to-Back of Head

Subject sits (Typ), head erect - the greatest straight-line distance from Menton to the most distant point at the back of the head, usually near the juncture of the occipital and the temporal bones of the cranium.

USAF.MEN	10.08	.31	9.4	9.6	10.1	10.6	10.8
n = 2420	25.60	.76	23.9	24.4	25.6	26.9	27.4

HEAD DIAGONAL, MAXIMUM FROM NUCHALE - see also Head Diagonal, Maximum from Inion

Subject sits (Typ), head erect - the greatest straight-line distance from Nuchale (inferior to Inion, palpable in the neck muscles on the posterior-inferior aspect of the skull) to the most distant point on the face, usually the nose or chin.

USAF.MEN	7.82	.30	7.2	7.4	7.8	8.3	8.5
n = 1236	19.86	.75	18.2	18.7	19.8	21.1	21.7

HEAD DIAGONAL, MAXIMUM FROM OCCIPUT - see Head Diagonal, Maximum from Inion

HEAD DIAGONAL, MENTON TO OCCIPUT

Subject sits (Typ), head erect - the straight-line distance from Menton to Occiput.

USAF.MEN	10.00	.33	9.3	9.4	10.0	10.6	10.8
n = 1236	25.40	.84	23.5	24.0	25.4	26.8	27.4

HEAD HEIGHT - see Tragion-to-Top of Head

HEAD LENGTH - see also Glabella-to-Back of Head and Head Diagonal, Maximum from Inion

Subject sits (Typ), head erect - the maximum length of the head between the Glabella and the Occiput in the midsagittal plane.

USAF.MEN	7.81	.27	7.2	7.4	7.8	8.3	8.5
n = 1236	19.83	.68	18.2	18.7	19.8	21.0	21.5

USAF.MEN	7.82	.26	7.2	7.4	7.8	8.3	8.5
n = 2420	19.87	.67	18.3	18.8	19.9	21.0	21.5

USAF.WOM	7.25	.27	6.6	6.8	7.2	7.7	7.9
n = 1905	18.41	.68	16.8	17.3	18.4	19.5	20.0

USAF.WOM	7.33	.26	6.7	6.9	7.3	7.8	7.9
n = 455	18.62	.67	16.9	17.5	18.6	19.7	20.0

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

HEEL BREADTH - see also Foot Breadth

Subject stands with weight equally distributed on both feet - the maximum breadth of the right heel behind the projections of the ankle bones at a right angle to the long axis of the foot.

USAF.MEN	2.63	.15	2.3	2.4	2.6	2.9	3.0
n = 4000	6.69	.37	5.9	6.1	6.7	7.3	7.6

HEEL CIRCUMFERENCE - see Heel-Ankle Circumference

HEEL-ANKLE CIRCUMFERENCE - see also Ball of Foot Circumference and Instep Circumference

Subject stands with weight equally distributed on both feet - the circumference of the aft part of the foot, passing under the inferior edge of the heel in contact with the floor and over the anterior ankle-foot juncture.

USAF.MEN	13.38	.60	12.1	12.4	13.3	14.4	15.0
n = 1236	33.98	1.53	30.7	31.5	33.9	36.6	38.2
USAF.MEN	13.37	.56	12.1	12.5	13.4	14.3	14.7
n = 2420	33.95	1.41	30.7	31.7	33.9	36.3	37.3

HEIGHT - see Stature

HIP BREADTH, SITTING - see also Hip Breadth, Standing and Thigh-to-Thigh Breadth, Sitting

Subject sits, feet resting on a surface adjusted so that the knees are flexed to about 90 degrees and thighs are parallel - the horizontal distance across the widest part of the hips.

USAF.MEN	14.63	.97	12.6	13.1	14.6	16.3	17.3
n = 1236	37.16	2.47	31.9	33.2	37.1	41.3	44.0
USAF.MEN	14.88	.91	12.9	13.4	14.8	16.4	17.2
n = 2420	37.79	2.30	32.7	34.2	37.7	41.8	43.8

HIP BREADTH, STANDING - see also Hip Breadth, Sitting; Bitrochanteric Breadth, Standing; Hip Breadth over Foundation Garment, Standing; and Biiliocristale Breadth

Subject stands erect, feet together - the horizontal distance across the widest part of the hips.

USAF.MEN	13.73	.79	12.0	12.5	13.7	15.1	15.9
n = 1236	34.88	2.00	30.5	31.7	34.8	38.3	40.3

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAFLY.MEN	13.89	.74	12.2	12.7	13.9	15.1	15.8
n = 2420	35.27	1.88	31.0	32.3	35.2	38.5	40.2
USAF.WOM	13.77	.87	11.9	12.4	13.7	15.3	16.1
n = 1905	34.97	2.22	30.2	31.6	34.8	38.8	40.9
USAFLY.WOM	13.90	.69	12.3	12.8	13.9	15.0	15.6
n = 455	35.31	1.74	31.3	32.5	35.3	38.2	39.7

HIP BREADTH OVER FOUNDATION GARMENT, STANDING - see also Hip Breadth, Standing

Subject (female) stands erect, feet together, wearing foundation garments of choice - the horizontal distance across the widest part of the hips.

USAF.WOM	13.26	.84	11.4	12.0	13.2	14.7	15.5
n = 1513	33.67	2.14	29.1	30.4	33.6	37.4	39.4
USAFLY.WOM	13.37	.64	12.0	12.3	13.4	14.4	14.9
n = 345	33.95	1.62	30.5	31.3	34.0	36.6	37.9

HIP CIRCUMFERENCE, SITTING - see also Hip Circumference, Standing and Hip Circumference over Foundation Garment, Sitting

Subject sits erect on a table, knees together, feet unsupported - the circumference around the hips, just under the buttocks where they touch the sitting surface in the rear, and up at about 45 degrees across the lap in the furrow between the torso and thighs.

USAF.MEN	41.17	3.03	35.3	36.2	41.3	46.0	49.7
n = 1236	104.58	7.69	89.6	91.9	104.8	116.9	126.2
USAFLY.MEN	42.38	2.65	36.7	38.2	42.3	47.0	49.1
n = 2420	107.64	6.74	93.1	97.1	107.4	119.3	124.6
USAF.WOM	39.37	2.40	34.4	35.7	39.2	43.6	46.5
n = 1905	100.00	6.09	87.4	90.8	99.5	110.8	118.0
USAFLY.WOM	39.64	1.61	36.1	37.0	39.6	42.3	43.5
n = 455	100.68	4.08	91.8	93.9	100.7	107.4	110.5

HIP CIRCUMFERENCE, STANDING - see also Hip Circumference, Sitting and Hip Circumference 7 Inches below Waist over Foundation Garment, Standing

Subject stands erect - the horizontal circumference around the hips at the level of maximum buttock protrusion.

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN	38.08	2.41	33.0	34.3	38.0	42.2	44.3
n = 1236	96.73	6.12	83.7	87.1	96.5	107.2	112.6
USAFLY.MEN	38.83	2.17	34.0	35.3	38.8	42.5	44.2
n = 2420	98.62	5.51	86.4	89.7	98.5	107.9	112.3

HIP CIRCUMFERENCE OVER FOUNDATION GARMENT, SITTING - see also Hip Circumference, Sitting

Subject (female) sits erect on a table, knees together, feet unsupported, wearing foundation garments of choice - the circumference around the hips, just under the buttocks where they touch the sitting surface in the rear, and up at about 45 degrees across the lap in the furrow between the torso and thighs.

USAF.WOM	39.22	2.40	34.4	35.7	39.0	43.4	46.4
n = 1513	99.62	6.10	87.3	90.6	99.1	110.3	117.8
USAFLY.WOM	39.35	1.59	35.9	36.6	39.4	41.9	42.9
n = 345	99.94	4.04	91.2	93.0	100.0	106.5	109.0

HIP CIRCUMFERENCE 7" BELOW WAIST LEVEL, STANDING - see also Hip Circumference 7" below Waist Level, over Foundation Garment, Standing and Hip Circumference 9" below Waist Level, Standing

Subject stands erect, heels together, weight distributed equally on both feet - the horizontal circumference of the torso 7 inches below "natural" waist (belt line).

USAF.WOM	36.87	2.20	32.3	33.5	36.7	40.7	43.3
n = 1905	93.64	5.59	82.0	85.1	93.2	103.3	109.9
USAFLY.WOM	37.01	1.54	33.3	34.4	37.0	39.5	40.4
n = 455	94.00	3.92	84.7	87.4	94.0	100.3	102.5

HIP CIRCUMFERENCE 9" BELOW WAIST LEVEL, STANDING - see also Hip Circumference 9" Below Waist Level, over Foundation Garment, Standing and Hip Circumference 7" below Waist Level, Standing

Subject stands erect, heels together, weight distributed equally on both feet - the horizontal circumference of the torso 9 inches below "natural" waist (belt line).

USAF.WOM	37.51	2.37	32.3	33.8	37.4	41.6	44.1
n = 1905	95.27	6.02	82.0	85.8	95.0	105.6	112.1
USAFLY.WOM	37.78	1.67	33.9	34.9	37.8	40.4	41.5
n = 455	95.95	4.25	86.1	88.7	96.0	102.7	105.5

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

HIP CIRCUMFERENCE 7" BELOW WAIST LEVEL, OVER FOUNDATION GARMENT, STANDING - see also Hip Circumference 7" below Waist Level, Standing and Hip Circumference 9" below Waist Level, over Foundation Garment, Standing

Subject (female) stands erect, heels together, weight distributed equally on both feet, and wearing foundation garments of choice - the horizontal circumference of the torso 7 inches below "natural" waist (belt line).

USAF.WOM	36.89	2.22	32.5	33.6	36.7	40.8	43.7
n = 1513	93.71	5.65	82.5	85.3	93.3	103.6	111.1
USAFLY.WOM	36.88	1.48	33.7	34.4	36.9	39.3	40.4
n = 345	93.67	3.77	85.6	87.3	93.7	99.7	102.7

HIP CIRCUMFERENCE 9" BELOW WAIST LEVEL, OVER FOUNDATION GARMENT, STANDING - see also Hip Circumference 9" below Waist Level, Standing and Hip Circumference 7" below Waist Level, over Foundation Garment, Standing

Subject (female) stands erect, heels together, weight distributed equally on both feet, and wearing foundation garments of choice - the horizontal circumference of the torso 9 inches below "natural" waist (belt line).

USAF.WOM	37.52	2.30	32.5	33.9	37.4	41.4	43.9
n = 1513	95.30	5.83	82.6	86.2	95.1	105.2	111.6
USAFLY.WOM	37.63	1.61	33.9	34.8	37.7	40.2	41.1
n = 345	95.58	4.09	86.2	88.5	95.7	102.2	104.5

HIP DEPTH, STANDING - see also Hip Depth over Foundation Garment, Standing

Subject stands erect - the horizontal depth of the hips at the level of the maximum rearward protrusion of the buttocks.

USAF.MEN	9.76	.89	7.9	8.3	9.7	11.3	11.9
n = 1236	24.78	2.25	20.0	21.2	24.7	28.6	30.3
USAFLY.MEN	9.44	.81	7.7	8.2	9.4	10.8	11.4
n = 2420	23.97	2.05	19.4	20.7	23.9	27.5	28.8
USAF.WOM	8.33	.70	6.9	7.2	8.3	9.6	10.3
n = 1905	21.15	1.79	17.4	18.4	21.0	24.3	26.2
USAFLY.WOM	8.28	.53	7.1	7.4	8.3	9.2	9.6
n = 455	21.02	1.35	18.0	18.8	21.0	23.3	24.3

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

HIP DEPTH OVER FOUNDATION GARMENT, STANDING - see also Hip Depth, Standing

Subject (female) stands erect, wearing foundation garments of choice - the horizontal depth of the hips at the level of the maximum rearward protrusion of the buttocks.

USAF.WOM	8.50	.78	7.0	7.4	8.4	9.9	11.0
n = 1513	21.59	1.97	17.9	18.7	21.4	25.2	28.0
USAF.LY.WOM	8.40	.54	7.2	7.5	8.4	9.3	9.8
n = 345	21.34	1.37	18.4	19.0	21.4	23.6	25.0

HIP HEIGHT - see Buttock Height, Trochanterion Height and Cristale Height, Standing

HUMERAL BREADTH - see Elbow Breadth, Bone

-I-J-K-L-

-I-J-K-L-

-I-J-K-L-

ILIOCRISTALE HEIGHT, STANDING - see also Trochanterion Height and Buttock Height, Standing

Subject stands erect - the vertical distance from the standing surface to the superior rim of the ilium in the midaxillary line (Iliocristale).

USAF.MEN	40.91	2.07	36.0	37.5	40.9	44.4	46.2
n = 1236	103.9	5.27	91.4	95.3	103.8	112.8	117.3
USAF.LY.MEN	42.97	1.89	38.5	39.9	43.0	46.1	47.5
n = 2420	109.15	4.80	97.9	101.3	109.1	117.2	120.7

INSTEP CIRCUMFERENCE - see also Heel-Ankle Circumference and Ball of Foot Circumference

Subject stands with weight equally distributed on both feet - the circumference of the right foot passing under the arch and in a vertical plane over the instep.

USAF.MEN	10.57	.52	9.4	9.7	10.6	11.5	11.9
n = 1236	26.85	1.32	24.0	24.7	26.8	29.1	30.3
USAF.LY.MEN	10.11	.48	9.1	9.4	10.1	10.9	11.3
n = 2420	25.69	1.21	23.1	23.8	25.6	27.8	28.8

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

INSTEP LENGTH - see also Foot Length

Subject stands with weight equally distributed on both feet - the horizontal distance from the heel forward and parallel to the long axis of the foot to the metatarsal-phalangeal joint I (the "ball" of the foot) on the medial side.

USAF.MEN	7.69	.37	6.9	7.1	7.7	8.3	8.6
n = 1236	19.53	.95	17.4	18.0	19.5	21.1	21.9
USAFLY.MEN	7.79	.37	6.9	7.2	7.8	8.4	8.7
n = 2420	19.79	.95	17.6	18.3	19.8	21.4	22.1

INTEROCULAR DISTANCE - see also Biocular Breadth, and Interpupillary Distance

Subject sits (Typ), head erect - the distance between the inner corners (Internal Canthi) of the eyes.

USAF.MEN	1.24	.11	1.0	1.1	1.3	1.4	1.5
n = 1236	3.16	.28	2.5	2.7	3.2	3.6	3.9
USAFLY.MEN	1.31	.11	1.1	1.1	1.3	1.5	1.6
n = 2420	3.33	.28	2.7	2.9	3.3	3.8	4.0

INTERPUPILLARY DISTANCE - see also Interocular Distance and Biocular Breadth

Subject sits (Typ), head erect, eyes focused at a distant object - the distance between the centers of the subject's pupils.

USAF.MEN	2.52	.14	2.2	2.3	2.5	2.8	2.9
n = 1236	6.41	.36	5.5	5.8	6.4	7.0	7.3
USAFLY.MEN	2.47	.14	2.2	2.2	2.5	2.7	2.8
n = 2420	6.27	.36	5.5	5.7	6.3	6.9	7.2

INTERSCYE DISTANCE - see also Interscye Distance, Maximum and Back Curvature Length

Subject stands erect (Typ), upper arms hanging at sides and forearms extended horizontally - the surface distance between the right and left scye landmarks.

USAF.MEN	15.08	1.17	12.4	13.1	15.1	17.0	18.0
n = 1236	38.30	2.98	31.6	33.4	38.3	43.3	45.6
USAFLY.MEN	15.26	1.48	11.7	12.8	15.3	17.7	18.7
n = 2420	38.76	3.76	29.8	32.5	38.8	45.0	47.5

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.WOM	13.80	.96	11.7	12.3	13.8	15.4	16.2
n = 1905	35.06	2.44	29.7	31.2	35.0	39.2	41.0
USAFLY.WOM	13.78	.91	11.7	12.2	13.8	15.2	15.7
n = 455	35.01	2.32	29.7	31.0	35.1	38.7	39.8

INTERSCYE DISTANCE, MAXIMUM - see also Interscye Distance

Subject stands with torso flexed forward at the hip to about 90 degrees, arms hanging relaxed in the downward position - the surface distance between the right and left scye marks (marked while subject is standing erect, as for Interscye Distance).

USAFLY.MEN	24.23	1.19	21.3	22.3	24.2	26.2	27.0
n = 2420	61.54	3.02	54.0	56.6	61.5	66.6	68.7
USAF.WOM	19.44	1.30	16.3	17.3	19.5	21.5	22.4
n = 1905	49.39	3.29	41.4	43.9	49.4	54.7	56.9
USAFLY.WOM	19.74	1.22	16.5	17.7	19.8	21.7	22.3
n = 455	50.14	3.09	42.0	44.9	50.2	55.1	56.7

JAW BREADTH - see Bigonial Breadth

KNEE BREADTH, BONE - See also Knee-to-Knee Breadth

Subject sits with right knee flexed to about 90 degrees - the maximum breadth between the femoral epicondyles, with firm pressure to approximate a bony dimension.

USAF.MEN	3.76	.19	3.3	3.5	3.7	4.1	4.2
n = 1236	9.55	.48	8.5	8.8	9.5	10.4	10.7
USAFLY.MEN	3.93	.18	3.5	3.6	3.9	4.2	4.4
n = 2420	9.98	.45	9.0	9.3	10.0	10.7	11.1
USAF.WOM	3.20	.18	2.8	2.9	3.2	3.5	3.6
n = 1905	8.12	.45	7.0	7.4	8.1	8.9	9.2
USAFLY.WOM	3.23	.17	2.8	3.0	3.2	3.5	3.7
n = 455	8.21	.43	7.0	7.5	8.2	8.9	9.3

KNEE CIRCUMFERENCE, SITTING - see also Knee Circumference, Standing

Subject sits erect, feet resting on a surface so that the thighs are horizontal and the knees are flexed to about 90 degrees - the maximum circumference of the right knee, passing under the popliteal area and up at about 45 degrees over the knee.

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN	15.30	.91	13.5	13.9	15.2	16.9	17.7
n = 1236	38.85	2.32	34.2	35.2	38.7	42.8	44.9
USAFLY.MEN	15.47	.83	13.7	14.2	15.4	16.9	17.6
n = 2420	39.30	2.12	34.8	36.0	39.2	43.0	44.7

KNEE CIRCUMFERENCE, STANDING - see also Knee Circumference, Sitting

Subject stands erect - the circumference of the right knee over the center of the patella.

USAF.MEN	15.07	.86	13.3	13.7	15.0	16.5	17.3
n = 1236	38.29	2.19	33.7	34.8	38.2	42.0	43.9
USAFLY.MEN	15.23	.81	13.4	13.9	15.2	16.6	17.3
n = 2420	38.68	2.07	34.0	35.4	38.6	42.2	43.8
USAF.WOM	14.29	.89	12.5	12.9	14.2	15.8	16.6
n = 1905	36.30	2.27	31.7	32.8	36.2	40.2	42.3
USAFLY.WOM	14.45	.69	12.8	13.3	14.4	15.6	16.0
n = 455	36.71	1.74	32.6	33.8	36.7	39.6	40.7

KNEE HEIGHT, SITTING - see also Knee Height, Standing; Patella-Top Height, Standing and Popliteal Height, Sitting

Subject sits with feet resting on a surface adjusted so that the thighs are horizontal and the knees are flexed to about 90 degrees - the vertical distance from the footrest surface to the superior margin of the right patella (USAF.MEN). For USAFLY.MEN this landmark was palpated and marked on standing subject.

USAF.MEN	21.80	1.03	19.5	20.1	21.8	23.5	24.4
n = 1236	55.37	2.62	49.5	51.1	55.3	59.7	61.9
USAFLY.MEN	21.95	.98	19.7	20.4	21.9	23.6	24.4
n = 2420	55.76	2.49	50.1	51.7	55.7	59.9	61.9

KNEE HEIGHT, STANDING - see also Knee Height, Sitting; Patella-Top Height, Standing; Patella-Bottom Height, Standing and Tibiale Height, Standing

Subject stands erect - the vertical distance from the floor to the middle of the right patella.

USAFLY.MEN	19.55	.98	17.3	18.0	19.5	21.2	21.9
n = 2420	49.65	2.49	44.0	45.7	49.6	53.9	55.7

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

KNEE-TO-KNEE - see also Knee Breadth, Bone and Hip Breadth, Sitting

Subject sits erect, feet resting on a surface so that the thighs are horizontal, knees are together and flexed to about 90 degrees - the maximum horizontal distance across the lateral surfaces of the knees (lateral epicondyles of the humerus).

USAF.MEN	8.96	.78	7.5	7.8	8.9	10.3	11.4
n = 1236	22.76	1.98	19.1	19.8	22.6	26.2	28.9
USAFLY.MEN	7.92	.49	6.9	7.2	7.9	8.8	9.3
n = 4000	20.11	1.25	17.6	18.3	20.0	22.4	23.6

KNUCKLE HEIGHT, STANDING - see Metacarpale III Height, Standing

LARYNX-TO-BACK OF HEAD

Subject stands erect, head oriented in the Frankfort plane - the horizontal distance from the back of the head to the most forward projection of the larynx ("Adam's Apple").

USAFLY.MEN	6.95	.46	5.8	6.2	7.0	7.7	8.0
n = 4000	17.65	1.18	14.8	15.7	17.7	19.6	20.3

LARYNX-TO-WALL - see Larynx-to-Back of Head

LATERAL MALLEOLUS HEIGHT - see also Medial Malleolus Height and Ankle Height

Subject stands, weight equally distributed on both feet - the height of the most projecting point of the lateral malleolus of the right foot.

USAF.MEN	2.83	.25	2.3	2.4	2.8	3.2	3.4
n = 1236	7.20	.63	5.9	6.2	7.2	8.2	8.7
USAFLY.MEN	2.77	.21	2.3	2.4	2.8	3.1	3.3
n = 2420	7.04	.54	5.8	6.2	7.0	8.0	8.4
USAF.WOM	2.67	.23	2.1	2.3	2.7	3.1	3.3
n = 1905	6.77	.59	5.3	5.8	6.8	7.8	8.3
USAFLY.WOM	2.77	.21	2.3	2.4	2.8	3.1	3.3
n = 455	7.04	.53	5.8	6.1	7.0	8.0	8.5

LEG CIRCUMFERENCE - see Calf Circumference and Thigh Circumference, Standing

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

LIP LENGTH - see also Lip Length, Smiling and Lip-to-Lip Distance
Subject sits (Typ), facial muscles relaxed and mouth closed
- the maximum distance between the corners of the mouth.

USAF.MEN	2.00	.16	1.7	1.7	2.0	2.3	2.4
n = 1236	5.08	.41	4.2	4.4	5.1	5.8	6.1
USAFLY.MEN	2.06	.15	1.7	1.8	2.1	2.3	2.4
n = 2420	5.23	.37	4.3	4.6	5.2	5.8	6.1
USAF.WOM	1.72	.17	1.4	1.5	1.7	2.0	2.1
n = 1905	4.38	.42	3.5	3.7	4.4	5.1	5.4
USAFLY.WOM	1.72	.16	1.4	1.5	1.7	2.0	2.1
n = 455	4.38	.41	3.5	3.7	4.4	5.1	5.4

LIP LENGTH, SMILING - see also Lip Length
Subject sits, mouth closed, but smiling - the maximum distance between the corners of the mouth.

USAF.MEN	2.31	.25	1.8	1.9	2.3	2.8	3.0
n = 1236	5.87	.64	4.6	4.9	5.8	7.0	7.5

LIP PROTRUSION-TO-BACK OF HEAD

Subject stands (Typ), head in Frankfort plane - the horizontal distance from the back of the head to the most anterior projection of the lips in the midsagittal plane.

USAF.MEN	8.17	.35	7.4	7.6	8.1	8.7	9.0
n = 1236	20.76	.88	18.9	19.3	20.7	22.2	22.8
USAFLY.MEN	8.33	.34	7.5	7.8	8.3	8.9	9.1
n = 2420	21.16	.86	19.1	19.7	21.2	22.5	23.0
USAF.WOM	7.60	.42	6.7	7.0	7.6	8.3	8.8
n = 1905	19.30	1.06	17.1	17.7	19.2	21.2	22.3
USAFLY.WOM	7.63	.41	6.7	7.0	7.6	8.3	8.8
n = 455	19.39	1.03	17.1	17.8	19.3	21.2	22.3

LIP PROTRUSION-TO-WALL - see Lip Protrusion-to-Back of Head

LIP-TO-LIP LENGTH - see also Lip Length

Subject sits (Typ), facial muscles relaxed and mouth closed
- the maximum distance between the lower margin of the lower lip to the upper margin of the upper lip.

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN	.68	.15	.4	.4	.7	.9	1.1
n = 1236	1.72	.37	.9	1.1	1.7	2.3	2.9
USAFLY.MEN	.68	.15	.3	.4	.7	.9	1.0
n = 2420	1.73	.38	.7	1.1	1.8	2.3	2.6

LOWER ARM CIRCUMFERENCE, EXTENDED - see Forearm Circumference, Extended

LOWER ARM CIRCUMFERENCE, FLEXED - see Forearm Circumference, Flexed

LOWER ARM CIRCUMFERENCE, RELAXED - see Forearm Circumference, Extended

LOWER THIGH CIRCUMFERENCE, STANDING - see also Thigh Circumference, Standing and Thigh Circumference, Sitting

Subject stands - the circumference of the thigh just above the right knee, over the medial vastus muscle but distal to any portion of the lateral vastus muscle.

USAF.MEN	16.59	1.36	13.8	14.4	16.6	18.9	20.2
n = 1236	42.13	3.45	35.0	36.6	42.1	48.0	51.4
USAFLY.MEN	17.30	1.36	14.3	15.1	17.3	19.6	20.7
n = 4000	43.95	3.46	36.2	38.3	43.9	49.8	52.5

-M-N-

-M-N-

-M-N-

MAXIMUM FRONTAL HEAD BREADTH - see Head Breadth, Maximum Frontal

MAXIMUM REACH FROM WALL - see also Arm Reach from Wall and Thumb-Tip Reach, Extended

Subject stands erect in a corner of a room (Typ), back pressed against the rear wall, right shoulder thrust as far forward as possible, right arm and hand extended horizontally along the side wall - the distance from the rear wall to the tip of the longest finger.

USAFLY.MEN	38.59	1.86	34.3	35.5	38.6	41.7	43.1
n = 4000	98.01	4.73	87.2	90.1	98.0	105.8	109.5

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

MEDIAL MALLEOLUS HEIGHT - see also Lateral Malleolus Height, Sphyrion Height, and Ankle Height

Subject stands with weight equally distributed on both feet - the height of the most projecting point on the medial malleolus.

USAF.MEN	3.28	.23	2.7	2.9	3.3	3.7	3.9
n = 1236	8.32	.58	6.8	7.4	8.3	9.3	9.8
USAFLY.MEN	3.37	.22	2.9	3.0	3.4	3.7	3.9
n = 2420	8.57	.57	7.3	7.6	8.6	9.5	9.9

MENTON PROJECTION

Subject stands erect, head oriented in the Frankfort plane - the straight-line distance from the most forward point of the chin to its juncture with the neck.

USAFLY.MEN	1.87	.26	1.3	1.5	1.9	2.3	2.5
n = 4000	4.76	.66	3.3	3.7	4.8	5.9	6.4

MENTON-CRINION LENGTH

Subject sits, facial muscles are relaxed and jaws are closed - the distance vertically from the bottom surface of the chin (Menton) to the midpoint of the hair line (Crinion). If there is evidence of balding, this measurement is omitted.

USAFLY.MEN	7.35	.35	6.6	6.8	7.4	7.9	8.2
n = 4000	18.68	.90	16.7	17.2	18.7	20.2	20.9

MENTON-NASAL ROOT DEPRESSION LENGTH - see also Menton-Subnasale Length

Subject sits (Typ) - the straight-line distance from Menton to the deepest point of the Nasal Root Depression (Sellion).

USAF.MEN	4.64	.27	4.0	4.2	4.6	5.1	5.3
n = 1236	11.79	.68	10.2	10.7	11.8	12.9	13.4
USAFLY.MEN	4.74	.24	4.2	4.3	4.7	5.1	5.3
n = 2420	12.03	.61	10.7	11.0	12.0	13.0	13.5
USAF.WOM	4.19	.24	3.6	3.8	4.2	4.6	4.8
n = 1905	10.63	.61	9.2	9.6	10.6	11.7	12.1
USAFLY.WOM	4.25	.23	3.7	3.9	4.3	4.6	4.8
n = 455	10.79	.59	9.4	9.8	10.8	11.8	12.3

MENTON-SELLION LENGTH - see Menton-Nasal Root Depression Length

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

MENTON-SUBNASALE LENGTH - see also Menton-Nasal Root Depression Length

Subject sits (Typ) with facial muscles relaxed and mouth closed - the straight-line distance from Menton to Subnasale.

USAF.MEN	2.69	.23	2.2	2.3	2.7	3.1	3.2
n = 1236	6.83	.59	5.5	5.8	6.8	7.8	8.2
USAFLY.MEN	2.72	.21	2.2	2.4	2.7	3.1	3.2
n = 2420	6.90	.53	5.7	6.1	6.9	7.8	8.1
USAF.WOM	2.18	.20	1.7	1.9	2.2	2.5	2.7
n = 1905	5.54	.51	4.3	4.7	5.5	6.4	6.8
USAFLY.WOM	2.22	.20	1.8	1.9	2.2	2.6	2.7
n = 455	5.64	.50	4.5	4.8	5.6	6.5	6.9

MENTON-TO-BACK OF HEAD - see also Menton-to-Top of Head and Head Diagonal, Maximum from Menton

Subject stands erect (Typ) with head in Frankfort plane - the horizontal distance from the back of the head to the forward projection of the chin.

USAF.MEN	7.67	.44	6.6	6.9	7.7	8.4	8.7
n = 1236	19.47	1.13	16.8	17.6	19.5	21.3	22.1
USAF.WOM	7.18	.45	6.2	6.5	7.1	7.9	8.4
n = 1905	18.23	1.14	15.8	16.5	18.2	20.2	21.2
USAFLY.WOM	7.18	.45	6.2	6.5	7.2	8.0	8.5
n = 455	18.23	1.14	15.8	16.4	18.2	20.2	21.5

MENTON-TO-TOP OF HEAD - see also Menton-to-Back of Head

Subject stands erect (Typ), head oriented in the Frankfort plane - the vertical distance from Menton to the top of the head (Vertex).

USAF.MEN	8.81	.40	7.8	8.1	8.8	9.5	9.7
n = 1236	22.39	1.02	19.9	20.7	22.4	24.1	24.7
USAFLY.MEN	8.96	.40	8.0	8.3	9.0	9.6	9.9
n = 2420	22.77	1.02	20.4	21.1	22.8	24.5	25.1
USAF.WOM	8.63	.45	7.6	7.9	8.6	9.4	9.7
n = 1905	21.91	1.14	19.2	20.1	21.9	23.8	24.6
USAFLY.WOM	8.78	.43	7.9	8.1	8.8	9.5	9.8
n = 455	22.31	1.09	20.0	20.6	22.3	24.1	24.9

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

MENTON-TO-VERTEX - see Menton-to-Top of Head

MENTON-TO-WALL - see Menton-to-Back of Head

METACARPALE III HEIGHT, STANDING - see also Dactylion Height, Standing

Subject stands erect - the distance from the standing surface to the largest knuckle of the right hand (the juncture of the metacarpal and first phalanx of third [middle] finger).

USAFLY.MEN	30.05	1.43	26.8	27.7	30.0	32.4	33.4
n = 4000	76.32	3.64	68.1	70.4	76.3	82.3	84.9

MIDSHOULDER HEIGHT, SITTING - see also Acromial Height, Sitting

Subject sits erect, head in the Frankfort plane, upper arms hanging relaxed, and forearms and hands directed forward - the vertical distance from the sitting surface to a point midway along the superior surface of the shoulder between the base of the neck and the tip of the shoulder (Acromiale).

USAF.MEN	25.09	1.15	22.4	23.2	25.1	27.0	27.9
n = 1236	63.74	2.93	57.0	59.0	63.7	68.6	70.9
USAFLY.MEN	25.43	1.08	23.0	23.7	25.4	27.3	28.0
n = 2420	64.59	2.74	58.3	60.2	64.5	69.2	71.1
USAF.WOM	22.83	1.05	20.6	21.2	22.8	24.6	25.3
n = 1905	58.00	2.66	52.3	53.7	57.9	62.5	64.4
USAFLY.WOM	23.80	.74	22.2	22.6	23.7	25.1	25.7
n = 455	60.46	1.89	56.3	57.5	60.3	63.7	65.2

MINIMUM FRONTAL (HEAD) ARC

Subject sits (Typ) - the minimum surface distance across the forehead above the brow ridges between the greatest medial indentations of the temporal lines just superior to the zygomatic arches on each side of the forehead.

USAF.MEN	4.82	.34	4.1	4.3	4.8	5.4	5.7
n = 1236	12.25	.87	10.3	10.9	12.2	13.8	14.4
USAFLY.MEN	5.35	.31	4.7	4.8	5.4	5.9	6.1
n = 2420	13.60	.79	11.9	12.3	13.6	14.9	15.5

MOUTH BREADTH - see Lip Length

MOUTH BREADTH, SMILING - see Lip Length, Smiling

NASAL BREADTH - see Nose Breadth

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

NASAL ROOT BREADTH - see also Nose Breadth

Subject sits (Typ) - the breadth of the nasal root at its deepest point.

USAF.MEN	.73	.10	.5	.6	.7	.9	1.0
n = 1236	1.86	.26	1.3	1.4	1.9	2.3	2.5
USAFLY.MEN	.61	.08	.4	.5	.6	.8	.8
n = 4000	1.55	.21	1.0	1.2	1.6	1.9	2.0

NASAL ROOT HEIGHT, STANDING - see Nasal Root Depression Height, Standing

NASAL ROOT DEPRESSION HEIGHT, STANDING - see also Eye Height, Standing

Subject stands erect, head oriented in the Frankfort plane - the vertical distance from the floor to the point of greatest indentation where the bridge of the nose meets the forehead (Nasal Root Depression or Sellion).

USAFLY.MEN	64.96	2.37	59.4	61.1	65.0	68.9	70.7
n = 4000	165.00	6.03	150.9	155.1	165.0	175.0	179.5

NASAL ROOT DEPRESSION-TO-BACK OF HEAD - see also Nasal Root Depression-to-Top of Head

Subject stands erect (Typ), head oriented in the Frankfort plane - the horizontal distance from Nasal Root Depression (Sellion) to the back of the head.

USAF.MEN	7.78	.26	7.2	7.4	7.8	8.2	8.4
n = 1236	19.77	.67	18.2	18.7	19.8	20.9	21.4
USAFLY.MEN	7.94	.26	7.3	7.5	7.9	8.4	8.6
n = 2420	20.17	.66	18.7	19.1	20.2	21.3	21.8

NASAL ROOT DEPRESSION-TO-TOP OF HEAD - see also Nasal Root Depression-to-Back of Head

Subject stands erect, head oriented in the Frankfort plane - the vertical distance from Nasal Root Depression (Sellion) to the top of the head (Vertex).

USAF.MEN	4.19	.33	3.5	3.7	4.2	4.8	5.0
n = 1236	10.63	.84	8.8	9.3	10.6	12.1	12.7
USAFLY.MEN	4.23	.37	3.4	3.6	4.2	4.9	5.1
n = 2420	10.75	.94	8.7	9.2	10.7	12.3	13.0

NASAL ROOT DEPRESSION-TO-VERTEX - see Nasal Root Depression-to-Top of Head

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

NASAL ROOT DEPRESSION-TO-WALL - see Nasal Root Depression-to-Back of Head

NECK CIRCUMFERENCE

Subject stands erect, head in the Frankfort plane - the circumference of the neck, including the Adam's apple, perpendicular to the long axis of the neck.

USAF.MEN	15.00	.81	13.1	13.7	15.0	16.4	17.0
n = 1236	38.10	2.06	33.4	34.9	38.0	41.6	43.2
USAFLY.MEN	15.09	.75	13.5	13.9	15.1	16.4	17.0
n = 2420	38.34	1.91	34.3	35.4	38.3	41.7	43.3
USAF.WOM	13.29	.66	11.9	12.2	13.3	14.4	15.0
n = 1905	33.75	1.68	30.2	31.1	33.7	36.7	38.2
USAFLY. WOM	13.39	.59	12.1	12.4	13.4	14.4	14.7
n = 455	34.02	1.49	30.8	31.6	34.0	36.5	37.4

NECK-TO-BUSTPOINT

Subject (female) stands erect looking straight ahead, wearing bra of choice - the straight-line distance from the right lateral neck-shoulder juncture in the lateral line to the tip of the right bust.

USAF.WOM	10.04	.74	8.4	8.9	10.0	11.3	11.9
n = 1905	25.49	1.89	21.4	22.5	25.4	28.8	30.3
USAFLY.WOM	10.11	.64	8.6	9.0	10.1	11.1	11.5
n = 455	25.67	1.62	21.9	22.9	25.7	28.2	29.1

NIPPLE HEIGHT, STANDING - see also Bustpoint Height, Standing

Subject stands erect, head in the Frankfort plane - the vertical distance from the standing surface to the center of the right nipple.

USAF.MEN	50.32	2.24	45.2	46.7	50.3	54.1	55.6
n = 1236	127.81	5.68	114.8	118.6	127.8	137.3	141.2
USAFLY.MEN	50.88	2.06	46.1	47.6	50.8	54.4	55.7
n = 2420	129.24	5.24	117.1	120.8	129.1	138.1	141.6

NOSE BREADTH - see also Nasal Root Breadth

Subject sits (Typ) - the maximum horizontal breadth of the nose.

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN n = 1236	1.37 3.48	.12 .31	1.1 2.9	1.2 3.0	1.4 3.5	1.6 4.0	1.8 4.5
USAFLY.MEN n = 2420	1.39 3.54	.11 .29	1.2 2.9	1.2 3.1	1.4 3.5	1.6 4.1	1.7 4.3
USAF.WOM n = 1905	1.26 3.19	.13 .33	1.0 2.5	1.1 2.7	1.2 3.2	1.5 3.8	1.6 4.2
USAFLY.WOM n = 455	1.25 3.18	.12 .31	1.0 2.5	1.1 2.7	1.3 3.2	1.5 3.7	1.6 4.1

NOSE LENGTH - see also Subnasale-Nasal Root Depression Length and Nose Protrusion

Subject sits (Typ) - the straight-line distance from the midpoint of the nasal root depression to the bottom of the nose.

USAFLY.MEN n = 4000	2.00 5.09	.13 .34	1.7 4.3	1.8 4.5	2.0 5.1	2.2 5.7	2.3 5.9
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NOSE PROTRUSION - see also Nose Length and Subnasale-Nasal Root Depression Length

Subject sits (Typ) - the distance from the juncture of the nasal septum and the philtrum of the upper lip to the maximum forward protrusion of the nose.

USAF.MEN n = 1236	.99 2.51	.11 .27	.7 1.8	.8 2.1	1.0 2.5	1.1 2.9	1.2 3.1
USAFLY.MEN n = 4000	.89 2.27	.11 .28	.6 1.6	.7 1.8	.9 2.3	1.1 2.7	1.2 3.0

NOSE-TO-BACK OF HEAD - see Pronasale-to-Back of Head

NOSE-TO-TOP OF HEAD - see Pronasale-to-Top of Head

-O-P-Q-R-

-O-P-Q-R-

-O-P-Q-R-

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

OVERHEAD REACH, STANDING - see also Thumb-Tip Reach, Extended

Subject stands erect along side of, but not touching, a side-wall mounted scale, and looking straight ahead. Holding a special pointer (or pencil) in the grip of the right fist, the pointer is raised as high as possible while keeping the feet flat on the floor and the pointer horizontal - the vertical distance from the floor to the tip of the pointer (grip).

USAF.WOM	78.44	3.37	71.3	72.9	78.4	84.0	86.0
n = 1905	199.23	8.56	181.2	185.2	199.2	213.3	218.4

PALM LENGTH - see also Hand Length

Right forearm and hand horizontal, palm up, hand flat, fingers together and extended - the distance from the proximal edge of the navicular bone of the wrist (USAF.MEN) or distal wrist crease at the base of the thumb (USAFLY.MEN) to the furrow formed where the middle finger folds upon the palm, just distal to the callous at the base of that finger.

USAF.MEN	4.48	.24	3.9	4.1	4.4	4.9	5.0
n = 1236	11.37	.61	10.0	10.4	11.3	12.4	12.8
USAFLY.MEN	4.26	.21	3.8	3.9	4.3	4.6	4.8
n = 2420	10.83	.54	9.6	10.0	10.8	11.8	12.1

PATELLA-BOTTOM HEIGHT, STANDING - see also Patella-Top Height, Standing and Knee Height, Sitting

Subject stands erect, feet together - the distance from the floor to the inferior margin of the patella.

USAF.MEN	18.36	1.04	16.1	16.7	18.3	20.2	21.1
n = 1236	46.63	2.65	41.0	42.4	46.5	51.2	53.5

PATELLA-TOP HEIGHT, STANDING - see also Patella-Bottom Height, Standing and Knee Height, Sitting

Subject stands erect - the vertical distance from the standing surface to the superior margin of the right patella.

USAF.MEN	20.54	1.07	18.2	18.8	20.5	22.3	23.3
n = 1236	52.17	2.73	46.3	47.7	52.1	56.7	59.2
USAFLY.MEN	20.72	1.01	18.4	19.1	20.7	22.4	23.2
n = 2420	52.62	2.56	46.8	48.5	52.6	56.9	58.9

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

PENALE HEIGHT - see also Crotch Height

Subject (male) stands erect - the vertical distance from the floor to the anterior (ventral) juncture of the penis with the abdomen.

USAF.MEN	34.53	1.73	30.6	31.7	34.5	37.4	38.7
n = 4000	87.71	4.40	77.6	80.5	87.7	95.0	98.3

PHILTRUM LENGTH

Subject stands (Typ), facial muscles relaxed, mouth closed - the length of the shallow groove (philtrum) which runs vertically from the center of the upper lip to the nasal septum.

USAF.MEN	.62	.10	.4	.4	.6	.8	.9
n = 1236	1.57	.26	1.0	1.1	1.6	2.0	2.2
USAF.MEN	.61	.11	.4	.4	.6	.8	.9
n = 2420	1.55	.28	.9	1.1	1.5	2.0	2.2

POPLITEAL HEIGHT, SITTING - see also Knee Height

Subject sits erect, feet resting on a surface adjusted so that the thighs are horizontal and the knees are flexed to approximate right angles - the vertical distance from the footrest surface to the underside of the tendon of the right biceps femoris muscle, laterally where it dives into the flesh of the leg.

USAF.MEN	17.43	.90	15.5	16.0	17.4	18.9	19.8
n = 1236	44.28	2.28	39.4	40.6	44.2	48.1	50.2
USAF.MEN	17.20	.89	15.2	15.8	17.2	18.7	19.3
n = 2420	43.70	2.25	38.5	40.1	43.7	47.5	49.1
USAF.WOM	16.16	.73	14.2	14.9	16.2	17.4	18.1
n = 1905	41.05	1.86	36.2	38.0	41.0	44.1	45.9
USAF.MEN	16.63	.63	15.3	15.7	16.6	17.8	18.3
n = 455	42.24	1.59	38.9	39.9	42.1	45.2	46.5

POSTERIOR NECK LENGTH - see also Anterior Neck Length

Subject stands erect, head in the Frankfort plane - the surface distance from Cervicale to the lowest point that can be palpated at the base of the skull posteriorly (USAF.MEN) or to Inion (USAF.MEN).

USAF.MEN	3.90	.58	2.6	3.0	3.9	4.9	5.4
n = 1236	9.90	1.47	6.6	7.5	9.9	12.4	13.6

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN	5.22	.67	3.7	4.2	5.2	6.4	6.7
n = 2420	13.25	1.69	9.5	10.6	13.2	16.2	17.1

POSTERIOR WAIST LENGTH - see Waist-Back Length

PRONASALE-TO-BACK OF HEAD - see also Pronasale-to-Top of Head and Head Diagonal, Maximum from Inion

Subject stands, head oriented in the Frankfort plane - the horizontal distance from the tip of the nose (Pronasale) to the back of the head.

USAF.MEN	8.77	.31	8.1	8.3	8.8	9.3	9.5
n = 1236	22.28	.79	20.5	21.0	22.3	23.6	24.2
USAF.MEN	8.93	.30	8.2	8.4	8.9	9.4	9.6
n = 2420	22.68	.75	20.9	21.4	22.7	23.9	24.4
USAF.WOM	8.34	.38	7.6	7.8	8.3	9.0	9.4
n = 1905	21.19	.96	19.2	19.7	21.1	22.9	23.9
USAF.MEN	8.43	.37	7.6	7.9	8.4	9.1	9.4
n = 455	21.41	.94	19.2	20.0	21.4	23.0	23.9

PRONASALE-TO-TOP OF HEAD - see also Pronasale-to-Back of Head
Subject stands, head oriented in the Frankfort plane - the vertical distance from the tip of the nose (Pronasale) to the top of the head (Vertex).

USAF.MEN	5.79	.38	4.9	5.2	5.8	6.4	6.7
n = 1236	14.70	.96	12.5	13.2	14.7	16.3	17.0
USAF.MEN	5.80	.43	4.9	5.1	5.8	6.5	6.9
n = 2420	14.74	1.10	12.3	13.0	14.7	16.6	17.4
USAF.WOM	5.81	.46	4.9	5.1	5.8	6.6	7.1
n = 1905	14.76	1.17	12.3	12.9	14.7	16.8	18.0
USAF.MEN	5.93	.45	5.0	5.2	5.9	6.7	7.2
n = 455	15.05	1.14	12.7	13.3	15.0	17.1	18.3

PRONASALE-TO-VERTEX - see Pronasale-to-Top of Head

PRONASALE-TO-WALL - see Pronasale-to-Back of Head

RADIALE-STYLION LENGTH

Subject stands, arms hanging at sides and right forearm supinated (rotated "outward," palm forward) - the straight-line distance between the right Radiale and right Stylion.
(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAFLY.MEN	10.58	.56	9.3	9.7	10.6	11.5	11.9
n = 2420	26.88	1.42	23.6	24.6	26.9	29.3	30.2
USAF.WOM	9.21	.54	8.0	8.3	9.2	10.1	10.6
n = 1905	23.39	1.37	20.3	21.2	23.4	25.7	26.9
USAFLY.WOM	9.52	.46	8.5	8.8	9.5	10.3	10.7
n = 455	24.17	1.17	21.5	22.3	24.1	26.2	27.1

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SAGITTAL ARC

Subject sits (Typ) - the distance along the superior surface of the skull and within the midsagittal (XZ) plane from Glabella to the lowest palpable point on the base of the skull posteriorly (USAF.MEN) to Inion (USAFLY.MEN, USAF.WOM and USAFLY.WOM).

USAF.MEN	15.17	.58	13.8	14.3	15.2	16.2	16.6
n = 1236	38.52	1.48	35.1	36.2	38.5	41.1	42.1
USAFLY.MEN	13.64	.65	12.1	12.5	13.6	14.7	15.1
n = 2420	34.64	1.66	30.9	31.9	34.7	37.3	38.4
USAF.WOM	13.70	.59	12.4	12.8	13.7	14.7	15.3
n = 1905	34.79	1.49	31.4	32.4	34.7	37.3	38.8
USAFLY.WOM	13.87	.58	12.6	13.0	13.8	14.9	15.4
n = 455	35.23	1.48	31.9	32.9	35.1	37.9	39.0

SCYE CIRCUMFERENCE - see also Axillary Arm Circumference

Subject stands (Typ), arms hanging at sides - the circumference of the right arm at the shoulder, as high as possible in the armpit and passing over Acromion (USAF.MEN) vertically over the shoulder (USAFLY.MEN, USAF.WOM, and USAFLY.WOM).

USAF.MEN	17.36	.99	15.1	15.7	17.4	19.0	19.9
n = 1236	44.10	2.51	38.4	39.9	44.1	48.2	50.6
USAFLY.MEN	19.04	1.10	16.5	17.2	19.0	20.9	21.7
n = 2420	48.36	2.79	42.0	43.8	48.4	53.0	55.2
USAF.WOM	14.61	.90	12.7	13.2	14.5	16.2	16.9
n = 1905	37.10	2.29	32.3	33.6	36.9	41.1	43.1

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAFLY.WOM	14.72	.73	13.0	13.5	14.7	15.9	16.4
n = 455	37.40	1.85	33.0	34.3	37.4	40.4	41.6

SELLION-TO-TOP OF HEAD - see Nasal Root Depression-to-Top of Head

SELLION-TO-VERTEX - see Nasal Root Depression-to-Top of Head

SELLION-TO-WALL - see Nasal Root Depression-to-Back of Head

SHOULDER BREADTH - see Biacromial Breadth and Bideltoid Breadth

SHOULDER CIRCUMFERENCE

Subject stands erect, arms hanging relaxed at sides - the maximum circumference of the shoulders at the level of the greatest lateral protrusion of the deltoid muscles.

USAF.MEN	45.61	2.33	40.6	41.9	45.6	49.6	51.4
n = 1236	115.84	5.93	103.0	106.4	115.7	125.9	130.5
USAFLY.MEN	46.33	2.29	41.0	42.7	46.3	50.2	52.0
n = 2420	117.69	5.82	104.2	108.4	117.5	127.6	132.0
USAF.WOM	39.53	2.02	35.6	36.5	39.4	43.1	45.2
n = 1905	100.41	5.14	90.5	92.6	100.0	109.4	114.7
USAFLY.WOM	39.67	1.59	36.0	37.1	39.6	42.3	43.1
n = 455	100.77	4.03	91.4	94.2	100.7	107.4	109.6

SHOULDER HEIGHT, SITTING - see Acromion Height, Sitting and Mid-Shoulder Height, Sitting

SHOULDER HEIGHT, STANDING - see Acromion Height, Standing

SHOULDER LENGTH

Subject stands erect (Typ), arms hanging relaxed at sides - the surface distance along the top of the right shoulder from the juncture of the neck and the shoulder to Acromion (Acromiale) in the mid-axillary line.

USAF.MEN	6.64	.51	5.4	5.8	6.7	7.5	7.9
n = 1236	16.87	1.30	13.8	14.8	16.9	19.1	20.0
USAFLY.MEN	6.54	.50	5.5	5.7	6.5	7.4	7.8
n = 2420	16.60	1.26	13.9	14.6	16.6	18.7	19.8
USAF.WOM	5.77	.40	4.8	5.1	5.7	6.5	6.8
n = 1905	14.66	1.02	12.3	13.0	14.6	16.4	17.2

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.FLY.WOM	5.92	.39	4.9	5.2	5.9	6.6	6.9
n = 455	15.04	.98	12.5	13.3	15.0	16.7	17.4

SHOULDER-ELBOW LENGTH - see also Acromion-Radiale Length

Subject sits erect, arms hanging relaxed at sides, elbow flexed to 90 degrees, forearms and hands directed forward horizontally - the vertical distance from the right Acromion (Acromiale) to the bottom of the elbow (olecranon process).

USAF.MEN	14.60	.72	12.9	13.4	14.6	15.8	16.3
n = 1236	37.09	1.83	32.8	34.1	37.1	40.2	41.4
USAF.FLY.MEN	14.15	.67	12.6	13.1	14.1	15.3	15.7
n = 2420	35.95	1.71	32.1	33.2	35.9	38.8	40.0

SHOULDER-TO-BICEPS CIRCUMFERENCE LEVEL - see Acromion-to-Biceps Circumference Level

SITTING HEIGHT - see also Sitting Height, Relaxed

Subject sits erect, head in the Frankfort plane, arms hanging naturally at sides, elbows flexed to 90 degrees, forearms and hands directed forward - the vertical distance from the sitting surface to the top of the head.

USAF.MEN	35.95	1.39	32.4	33.7	35.9	38.3	39.2
n = 1236	91.31	3.52	82.4	85.7	91.2	97.2	99.6
USAF.FLY.MEN	36.68	1.25	33.9	34.7	36.7	38.8	39.6
n = 2420	93.18	3.18	86.2	88.1	93.1	98.6	100.6
USAF.WOM	33.70	1.25	31.0	31.7	33.7	35.8	36.7
n = 1905	85.60	3.17	78.7	80.4	85.6	90.9	93.1
USAF.FLY.WOM	35.01	.70	34.0	34.1	34.9	36.4	37.0
n = 455	88.92	1.79	86.3	86.6	88.7	92.4	94.1

SITTING HEIGHT, RELAXED - see also Sitting Height

Subject sits relaxed with head in the Frankfort plane - the vertical distance from the sitting surface to the top of the head.

USAF.WOM	33.18	1.28	30.3	31.1	33.2	35.3	36.2
n = 1905	84.28	3.25	77.1	78.9	84.3	89.7	91.9
USAF.FLY.WOM	34.51	.76	33.0	33.4	34.4	35.9	36.7
n = 455	87.66	1.93	83.9	84.9	87.4	91.2	93.2

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

SKIN FOLD: DORSAL HAND

Subject stands relaxed (Typ) - measured in the center of the dorsum (back) of the right hand taking care not to include blood vessels.

USAF.MEN	.10	.02	<.1	.1	.1	.2	.2
n = 1236	.25	.06	.1	.2	.2	.4	.4

SKIN FOLD: JUXTA NIPPLE

Subject stands relaxed - measured 5 cm above the right nipple, following Langer's lines.

USAF.MEN	.17	.07	.1	.1	.2	.2	.6
n = 1236	.42	.19	.2	.2	.4	.6	1.4
USAFLY.MEN	.54	.26	.1	.2	.5	1.0	1.2
n = 2420	1.36	.67	.4	.5	1.3	2.6	3.1

SKIN FOLD: MEDIAL CALF

Subject stands with right foot resting on the seat of a chair so that the right hip and knee are flexed to about right angles - measured at the level of greatest circumference of the calf on the median line.

USAF.WOM	.63	.20	.1	.3	.6	1.0	1.1
n = 1905	1.59	.52	.2	.7	1.6	2.5	2.9
USAFLY.WOM	.60	.20	.1	.2	.6	.9	1.1
n = 455	1.52	.51	.2	.6	1.5	2.3	2.7

SKIN FOLD: SUBSCAPULAR

Subject stands relaxed - measured just below the inferior angle of the right scapula, following Langer's lines.

USAF.MEN	.52	.20	.2	.3	.5	.9	1.1
n = 1236	1.33	.52	.6	.7	1.2	2.4	2.9
USAFLY.MEN	.54	.21	.2	.3	.5	.9	1.2
n = 2420	1.37	.53	.6	.7	1.3	2.4	3.1
USAF.WOM	.51	.19	.2	.3	.5	.9	1.1
n = 1905	1.29	.48	.6	.7	1.2	2.2	2.9
USAFLY.WOM	.46	.15	.2	.3	.4	.7	1.0
n = 455	1.17	.38	.6	.7	1.1	1.9	2.5

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

SKIN FOLD: SUPRAILLIAC

Subject stands relaxed - measured at the level of the right iliac crest, following Langer's lines.

USAF.MEN	.67	.31	.2	.2	.7	1.2	1.4
n = 1236	1.71	.79	.4	.6	1.7	3.1	3.6
USAFLY.MEN	1.03	.46	.2	.3	1.0	1.8	2.1
n = 2420	2.62	1.18	.5	.8	2.6	4.6	5.3
USAF.WOM	.78	.28	.3	.4	.8	1.2	1.5
n = 1905	1.97	.70	.7	.9	1.9	3.2	3.8
USAFLY.WOM	.72	.23	.3	.3	.7	1.1	1.3
n = 455	1.84	.59	.7	.8	1.9	2.8	3.2

SKIN FOLD: SUPRAPATELLA

Subject stands relaxed - measured at the superior margin of the right patella, following Langer's lines.

USAFLY.MEN	.29	.09	.1	.2	.3	.5	.5
n = 2420	.73	.23	.3	.4	.7	1.2	1.4

SKIN FOLD: TRICEPS

Subject stands relaxed, arms hanging at sides - measured on the dorsum (back) of the right arm, midway between Acromiale and the tip of the olecranon proces, following Langer's lines.

USAF.MEN	.41	.19	.1	.2	.4	.7	1.0
n = 1236	1.04	.47	.3	.4	1.0	1.9	2.5
USAFLY.MEN	.50	.20	.2	.2	.5	.9	1.0
n = 2420	1.27	.51	.4	.5	1.2	2.2	2.7
USAF.WOM	.75	.21	.3	.4	.7	1.1	1.3
n = 1905	1.90	.54	.8	1.1	1.9	2.8	3.4
USAFLY.WOM	.72	.18	.4	.4	.7	1.0	1.1
n = 455	1.82	.46	.9	1.1	1.8	2.5	2.9

SKIN FOLD: XIPHOID LEVEL ON MIDAXILLARY LINE

Subject stands relaxed - measured at the level of the inferior margin of the xiphoid process on the right midaxillary line, following Langer's lines.

USAF.MEN	.49	.24	.1	.2	.5	.9	1.1
n = 1236	1.24	.62	.3	.4	1.2	2.4	2.9

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAFLY.MEN	.48	.22	.1	.2	.4	.9	1.1
n = 2420	1.21	.57	.4	.5	1.1	2.3	2.9

SLEEVE INSEAM LENGTH - see also Sleeve Length

Subject stands, right arm extended downward with the hand about 6 inches (15 cm) from the side of the body - the straight-line distance from the inferior margin of the tendon of the pectoralis major muscle which forms the anterior boundary of the right axilla (arm pit) to the wrist (Stylian).

USAF.MEN	19.22	1.04	17.0	17.5	19.2	20.9	21.8
n = 1236	48.82	2.63	43.3	44.5	48.8	53.2	55.3
USAFLY.MEN	19.11	1.01	16.8	17.5	19.1	20.8	21.5
n = 2420	48.54	2.56	42.7	44.4	48.5	52.8	54.7
USAF.WOM	17.37	.95	15.3	15.8	17.3	19.0	19.7
n = 1905	44.13	2.42	38.7	40.2	44.0	48.2	49.9
USAFLY.WOM	18.01	.80	16.3	16.8	18.0	19.4	20.2
n = 455	45.74	2.04	41.3	42.6	45.6	49.2	51.3

SLEEVE LENGTH - see also Sleeve Length: Spine-to-Scye Segment;
Sleeve Length: Spine-to-Elbow Segment and Sleeve
Inseam Length

Subject stands, arms held in a horizontal plane, elbows flexed to about right angles, dorsal surfaces of the first phalanges of the fists opposed in front of the chest, and shoulders relaxed - the horizontal surface distance from the midline of the thoracic spine to the end of the ulnar styloid process of the right wrist, over the tip of the the right elbow.

USAF.MEN	34.79	1.49	31.6	32.4	34.8	37.3	38.6
n = 1236	88.37	3.79	80.2	82.2	88.3	94.7	98.1
USAFLY.MEN	35.75	1.39	32.7	33.5	35.7	38.1	39.0
n = 2420	90.81	3.52	83.1	85.2	90.7	96.8	99.1
USAF.WOM	31.33	1.31	28.5	29.2	31.3	33.5	34.7
n = 1905	79.58	3.32	72.4	74.2	79.5	85.1	88.0
USAFLY.WOM	32.18	1.09	29.8	30.6	32.1	34.1	35.2
n = 455	81.73	2.77	75.7	77.6	81.5	86.7	89.4

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

SLEEVE LENGTH: SPINE-TO-ELBOW SEGMENT - see also Sleeve Length

Subject stands, arms held in a horizontal plane, elbows flexed to about right angles, dorsal surfaces of the first phalanges of the fists opposed in front of the chest, and shoulders relaxed - the horizontal surface distance from the midline of the thoracic spine to the tip of the right elbow (olecranon process).

USAF.MEN	23.22	1.07	20.7	21.4	23.2	25.0	25.9
n = 1236	58.97	2.73	52.5	54.4	59.0	63.4	65.7
USAFLY.MEN	23.85	1.03	21.6	22.2	23.8	25.6	26.4
n = 2420	60.57	2.62	54.8	56.4	60.5	65.0	67.0
USAF.WOM	20.99	.95	18.9	19.5	21.0	22.6	23.4
n = 1905	53.32	2.41	48.0	49.4	53.3	57.3	59.4
USAFLY.WOM	21.54	.83	19.8	20.2	21.5	23.0	23.6
n = 455	54.72	2.11	50.3	51.4	54.6	58.3	60.0

SLEEVE LENGTH: SPINE-TO-SCYE SEGMENT - see also Sleeve Length

Subject stands, arms held in a horizontal plane, elbows flexed to about right angles, dorsal surfaces of the first phalanges of the fists opposed in front of the chest, and shoulders relaxed - the horizontal surface distance from the midline of the thoracic spine to the right scye.

USAF.MEN	9.39	.74	7.7	8.3	9.4	10.7	11.1
n = 1236	23.85	1.87	19.6	21.0	23.8	27.1	28.3

??? Probable difference in landmark interpretation ???
between USAF.MEN and USAFLY.MEN, USAF.WOM & USAFLY.WOM

USAFLY.MEN	11.20	.71	9.6	10.0	11.2	12.4	12.9
n = 2420	28.45	1.81	24.3	25.5	28.4	31.5	32.7
USAF.WOM	8.02	.54	6.8	7.2	8.0	8.9	9.3
n = 1905	20.37	1.36	17.2	18.3	20.3	22.7	23.7
USAFLY.WOM	8.12	.54	6.8	7.3	8.1	9.1	9.6
n = 455	20.62	1.36	17.3	18.5	20.6	23.0	24.5

SLEEVE LENGTH: SPINE-TO-WRIST - see Sleeve Length

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

SPAN

Subject stands erect with arms extended horizontally and laterally to their maxima, hands flat, fingers extended - the distance between the tips of digits III.

USAFLY.MEN	70.79	2.92	63.9	66.0	70.8	75.6	77.6
n = 4000	179.81	7.42	162.4	167.6	179.8	192.0	197.0

SPHYRION HEIGHT - see also Medial Malleolus Height

Subject stands erect, weight distributed equally on both feet - the distance from the floor to the distal margin of the medial epicondyle of the right tibia at the ankle.

USAF.MEN	2.63	.25	2.0	2.2	2.6	3.0	3.2
n = 1236	6.68	.63	5.1	5.7	6.7	7.7	8.1

STATURE - see also Stature, Maximum

Subject stands erect, head in the Frankfort plane, heels together, and weight distributed equally on both feet - the distance from the floor to the top of the head.

USAF.MEN	69.21	2.65	63.1	65.0	69.2	73.7	75.5
n = 1236	175.80	6.74	160.3	165.0	175.7	187.1	191.8
USAFLY.MEN	69.82	2.44	64.3	65.8	69.8	73.9	75.5
n = 2420	177.34	6.19	163.2	167.2	177.3	187.7	191.8
USAF.WOM	63.82	2.36	58.9	60.0	63.8	67.8	69.5
n = 1905	162.10	6.00	149.5	152.4	162.0	172.1	176.5
USAFLY.WOM	66.32	1.48	63.9	64.3	66.1	69.2	70.7
n = 455	168.46	3.77	162.3	163.3	167.9	175.8	179.5

STATURE, MAXIMUM - see also Stature

Subject stands erect, head in the Frankfort plane, heels together, and weight distributed equally on both feet. Subject takes a deep breath, stretches to maximum stature, maintaining head orientation, and feet flat on the floor - the vertical distance from the floor to the top of the head.

USAF.WOM	64.07	2.37	59.1	60.2	64.0	68.0	69.9
n = 1905	162.75	6.02	150.0	152.9	162.6	172.8	177.5
USAFLY.WOM	66.57	1.49	64.3	64.6	66.3	69.4	70.9
n = 455	169.10	3.78	163.2	164.0	168.5	176.4	180.0

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

STOMION-TO-TOP OF HEAD

Subject stands (Typ), head oriented in the Frankfort plane - the vertical distance from the point of contact between the upper and lower lips in the mid-sagittal plane to the top of the head.

USAF.MEN	7.13	.35	6.3	6.5	7.1	7.7	8.0
n = 1236	18.11	.90	15.9	16.6	18.1	19.6	20.2
USAFLY.MEN	7.23	.39	6.3	6.6	7.2	7.9	8.2
n = 2420	18.37	1.00	16.1	16.7	18.4	20.0	20.7
USAF.WOM	7.02	.44	6.0	6.3	7.0	7.8	8.1
n = 1905	17.83	1.12	15.3	16.1	17.8	19.7	20.7
USAFLY.WOM	7.15	.43	6.2	6.5	7.1	7.9	8.2
n = 455	18.16	1.09	15.8	16.5	18.1	20.0	20.9

STOMION-TO-VERTEX - see Stomion-to-Top of Head

STRAP LENGTH

Subject (female) stands erect with head in Frankfort plane, wearing bra of choice - the surface distance from the tip of the right bust upward and across the back of the neck to the tip of the left bust.

USAF.WOM	25.68	1.54	22.3	23.3	25.6	28.4	29.6
n = 1905	65.22	3.92	56.7	59.2	64.9	72.1	75.2
USAFLY.WOM	25.90	1.25	23.1	23.8	25.9	28.0	28.7
n = 455	65.79	3.17	58.7	60.5	65.8	71.0	73.0

SUBNASALE-TO-NASAL ROOT DEPRESSION - see also Nose Length and Nose Protrusion

Subject stands (Typ) - the vertical distance from subnasale to the deepest point in the nasal root depression.

USAF.MEN	2.03	.15	1.7	1.8	2.0	2.3	2.4
n = 1236	5.16	.37	4.3	4.6	5.2	5.8	6.0
USAFLY.MEN	2.02	.15	1.7	1.8	2.0	2.3	2.4
n = 2420	5.13	.37	4.2	4.5	5.1	5.7	6.0
USAF.WOM	1.79	.16	1.4	1.5	1.8	2.1	2.2
n = 1905	4.55	.41	3.6	3.9	4.5	5.2	5.6
USAFLY.WOM	1.82	.16	1.4	1.6	1.8	2.1	2.2
n = 455	4.62	.40	3.6	4.0	4.6	5.3	5.5

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

SUBNASALE-SELLION LENGTH - see Subnasale-to-Nasal Root Depression Length

SUBNASALE-TO-BACK OF HEAD - see also Subnasale-to-Top of Head
Subject stands (Typ), head oriented in the Frankfort plane - the horizontal distance from Subnasale to the back of the head.

USAFLY.MEN	8.26	.31	7.5	7.7	8.3	8.8	9.0
n = 2420	20.99	.79	19.1	19.7	21.0	22.3	22.8
USAF.WOM	7.74	.39	6.9	7.2	7.7	8.4	8.8
n = 1905	19.66	.98	17.6	18.2	19.6	21.4	22.4
USAFLY.WOM	7.81	.38	6.9	7.2	7.8	8.5	8.9
n = 455	19.83	.97	17.6	18.3	19.8	21.5	22.5

SUBNASALE-TO-TOP OF HEAD - see also Subnasale-to-Back of Head
Subject stands (Typ), head oriented in the Frankfort plane - the vertical distance from Subnasale to the top of the head.

USAFLY.MEN	6.33	.40	5.4	5.7	6.3	7.0	7.3
n = 2420	16.09	1.02	13.8	14.5	16.1	17.8	18.5
USAF.WOM	6.26	.43	5.3	5.6	6.2	7.0	7.4
n = 1905	15.91	1.10	13.5	14.2	15.9	17.8	18.7
USAFLY.WOM	6.39	.42	5.5	5.7	6.4	7.1	7.5
n = 455	16.23	1.07	14.0	14.5	16.2	18.1	19.1

SUBNASALE-TO-VERTEX - see Subnasale-to-Top of Head

SUBNASALE-TO-WALL - see Subnasale-to-Back of Head

SUBSTERNALE HEIGHT, STANDING - see also Suprasternale Height, Standing

Subject stands erect - the vertical distance from the floor to the lowest point on the breast bone (Substernale).

USAFLY.MEN	48.72	1.99	44.1	45.5	48.7	52.0	53.5
n = 4000	123.75	5.06	112.1	115.6	123.7	132.2	135.9

SUPRASTERNALE HEIGHT, STANDING - see also Substernale Height, Standing

Subject stands erect - the vertical distance from the standing surface to Suprasternale (lowest point in the notch at the upper end of the breast bone).

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.MEN	56.42	2.35	51.1	52.6	56.4	60.3	61.9
n = 1236	143.30	5.96	129.9	133.6	143.3	153.2	157.2
USAFLY.MEN	57.17	2.17	52.2	53.7	57.1	60.8	62.3
n = 2420	145.20	5.50	132.5	136.3	145.1	154.5	158.2
USAF.WOM	51.97	2.09	47.4	48.6	51.9	55.5	57.0
n = 1905	132.00	5.30	120.5	123.4	131.9	140.9	144.8
USAFLY.WOM	54.03	1.39	51.5	52.0	53.9	56.7	58.0
n = 455	137.23	3.52	130.8	132.2	136.8	143.9	147.2

-T-U-V-

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THIGH CIRCUMFERENCE, SITTING - see also Thigh Circumference,
Standing and Lower Thigh Circumference

Subject sits erect on a table, thighs lightly touching and feet unsupported - the circumference of the right upper thigh, in a plane perpendicular to its long axis and as high in the crotch as possible.

USAF.MEN	22.59	1.95	18.4	19.4	22.6	25.9	27.6
n = 1236	57.37	4.96	46.7	49.3	57.3	65.8	70.2
USAFLY.MEN	22.78	1.68	18.8	20.0	22.8	25.6	26.9
n = 2420	57.87	4.27	47.7	50.8	57.9	65.0	68.3

THIGH CIRCUMFERENCE, STANDING - see also Thigh Circumference,
Sitting and Lower Thigh Circumference, Standing

Subject stands, legs slightly apart - the circumference of the right upper thigh, in a plane perpendicular to its long axis at the level of the lowest point on the gluteal furrow.

USAF.MEN	22.34	1.84	18.3	19.3	22.3	25.4	26.9
n = 1236	56.75	4.67	46.5	49.1	56.7	64.5	68.2
USAFLY.MEN	23.15	1.74	19.1	20.3	23.1	26.0	27.4
n = 2420	58.81	4.43	48.5	51.5	58.8	66.2	69.7
USAF.WOM	21.84	1.66	18.2	19.2	21.8	24.6	26.3
n = 1905	55.48	4.22	46.3	48.7	55.3	62.6	66.7
USAFLY.WOM	21.82	1.32	18.6	19.5	21.9	23.9	24.8
n = 455	55.43	3.36	47.2	49.5	55.6	60.8	63.0

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

THIGH CLEARANCE

Subject sits, feet resting on a surface adjusted so that the thighs are horizontal and the knees are flexed to 90 degrees - the distance from the sitting surface to the highest point on the right thigh.

USAF.MEN	6.22	.54	5.1	5.4	6.2	7.2	7.6
n = 1236	15.80	1.36	13.0	13.7	15.7	18.2	19.3
USAFLY.MEN	6.51	.54	5.3	5.6	6.5	7.4	7.8
n = 2420	16.53	1.38	13.4	14.3	16.5	18.8	19.9
USAF.WOM	4.90	.49	3.8	4.1	4.9	5.7	6.1
n = 1905	12.44	1.25	9.8	10.4	12.4	14.6	15.5
USAFLY.WOM	5.00	.45	4.0	4.2	5.0	5.7	6.0
n = 455	12.69	1.14	10.1	10.7	12.7	14.5	15.3

THIGH-TO-THIGH BREADTH, SITTING - see also Thigh-to-Thigh Breadth over Foundation Garment, Sitting and Hip Breadth, Standing

Subject sits erect, thighs parallel and feet unsupported - the maximum horizontal distance across the thighs.

USAF.WOM	15.04	1.13	12.6	13.3	14.9	17.0	18.1
n = 1905	38.19	2.86	32.1	33.8	38.0	43.3	45.9
USAFLY.WOM	15.04	.89	13.1	13.6	15.0	16.5	17.2
n = 455	38.20	2.26	33.2	34.5	38.2	41.9	43.7

THIGH-TO-THIGH BREADTH, SITTING, OVER FOUNDATION GARMENT - see also Thigh-to-Thigh Breadth, Sitting

Subject (female) sits erect, thighs parallel and feet unsupported, wearing foundation garments of choice - the maximum horizontal distance across the thighs.

USAF.WOM	14.67	1.04	12.5	13.1	14.6	16.5	17.5
n = 1905	37.25	2.65	31.7	33.2	37.1	41.9	44.5
USAFLY.WOM	14.69	.78	12.8	13.3	14.7	15.9	16.5
n = 455	37.32	1.98	32.6	33.9	37.4	40.5	41.8

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

THUMB-TIP REACH - see also Thumb-Tip Reach, Extended; Arm Reach from Wall and Vertical Reach

Subject stands erect with heels, buttocks, shoulder blades and head in contact with a wall or other vertical surface. The right arm is rotated forward to the horizontal, perpendicular to the rear wall, thumb and forefinger tips opposed in a grasping attitude, thumb extended and parallel to the axis of the arm and forearm - the distance from the wall to the tip of the thumb.

USAF.MEN	30.76	1.61	27.1	28.2	30.7	33.5	34.6
n = 1236	78.12	4.08	68.9	71.7	77.9	85.1	88.0
USAFLY.MEN	31.62	1.57	28.0	29.1	31.6	34.3	35.6
n = 2420	80.31	3.98	71.2	73.9	80.2	87.0	90.3
USAF.WOM	29.18	1.53	25.7	26.6	29.2	31.7	32.8
n = 1905	74.13	3.88	65.3	67.7	74.2	80.5	83.3
USAFLY.WOM	29.99	1.30	27.5	28.0	29.9	32.2	33.6
n = 455	76.17	3.30	69.8	71.1	76.0	81.9	85.3

THUMB-TIP REACH, EXTENDED - see also Thumb-Tip Reach and Maximum Reach from Wall

Subject stands erect with heels, buttocks, shoulder blades and head in contact with a wall or other vertical surface. The right arm is rotated forward to the horizontal, perpendicular to the rear wall, thumb and forefinger tips opposed in a grasping attitude, thumb extended and parallel to the axis of the arm and forearm. The subject then thrusts the right shoulder and arm forward maximally without breaking contact between the wall and the center of the back and left shoulder blade - the distance from the wall to the tip of the thumb.

USAFLY.MEN	35.27	1.78	31.1	32.4	35.2	38.3	39.6
n = 2420	89.59	4.51	79.1	82.3	89.4	97.3	100.7
USAF.WOM	33.00	1.92	28.8	29.9	33.0	36.3	37.8
n = 1905	83.83	4.88	73.2	76.0	83.7	92.3	96.1
USAFLY.WOM	34.03	1.67	30.5	31.4	33.9	37.0	38.1
n = 455	86.43	4.24	77.4	79.8	86.2	94.0	96.9

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

TIBIALE HEIGHT, STANDING - see also Knee Height, Standing

Subject stands erect, feet separated a distance of about 4 inches and weight distributed equally on both feet - the vertical distance from the standing surface to the proximal medial margin of the right tibia, typically within the dimple immediately inferior and medial to the patella. .

USAF.WOM	16.53	.94	14.5	15.1	16.5	18.1	18.9
n = 1905	41.98	2.38	36.9	38.2	41.9	46.1	48.0
USAFLY.WOM	17.20	.82	15.4	16.0	17.1	18.7	19.4
n = 455	43.69	2.08	39.2	40.6	43.5	47.5	49.2

TRAGION HEIGHT, STANDING - see also Eye Height, Standing

Subject stands erect, head oriented in the Frankfort plane - the vertical distance from the floor to Tragion.

USAFLY.MEN	63.93	2.37	58.5	60.0	63.9	67.8	69.6
n = 4000	162.38	6.02	148.6	152.5	162.4	172.3	176.8

TRAGION-TO-BACK OF HEAD - see also Tragion-to-Top of Head

Subject stands erect (Typ), head oriented in the Frankfort plane - the horizontal distance from Tragion to the back of the head.

USAF.MEN	3.89	.26	3.3	3.5	3.9	4.3	4.5
n = 1236	9.87	.67	8.4	8.8	9.9	11.0	11.5
USAFLY.MEN	4.07	.26	3.5	3.7	4.1	4.5	4.7
n = 2420	10.33	.65	8.9	9.3	10.3	11.4	11.9
USAF.WOM	4.00	.35	3.3	3.5	4.0	4.6	5.1
n = 1905	10.17	.90	8.4	8.9	10.1	11.8	12.9
USAFLY.WOM	4.04	.35	3.3	3.5	4.0	4.7	5.1
N = 455	10.26	.90	8.4	9.0	10.2	11.9	12.9

TRAGION-TO-TOP OF HEAD - see also Tragion-to-Back of Head

Subject stands erect (Typ), head oriented in the Frankfort plane - the vertical distance from Tragion to the top of the head.

USAF.MEN	5.18	.25	4.6	4.8	5.2	5.6	5.8
n = 1236	13.15	.63	11.6	12.1	13.1	14.2	14.7
USAFLY.MEN	5.30	.24	4.7	4.9	5.3	5.7	5.9
n = 2420	13.45	.61	12.0	12.4	13.5	14.5	14.9

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAF.WOM	5.01	.30	4.4	4.6	5.0	5.5	5.8
n = 1905	12.73	.76	11.1	11.6	12.7	14.1	14.7
USAFLY.WOM	5.08	.30	4.5	4.6	5.1	5.6	5.8
n = 455	12.91	.77	11.4	11.7	12.9	14.2	14.7

TRAGION-TO-VERTEX - see Tragion-to-Top of Head

TRAGION-TO-WALL - see Tragion-to-Back of Head

TROCHANTERION HEIGHT - see also Buttock Height, Gluteal Furrow Height, and Iliocristale Height

Subject stands erect - the vertical distance from the standing surface to Trochanterion on the right thigh.

USAF.MEN	36.46	1.88	32.2	33.5	36.4	39.7	41.1
n = 1236	92.61	4.77	81.8	85.1	92.4	100.9	104.5
USAFLY.MEN	36.99	1.71	33.1	34.2	37.0	39.9	41.1
n = 2420	93.96	4.35	84.0	86.9	93.9	101.3	104.3
USAF.WOM	32.55	1.68	28.8	29.8	32.5	35.4	36.6
n = 1905	82.67	4.27	73.2	75.7	82.6	89.8	92.9
USAFLY.WOM	33.83	1.36	30.9	31.7	33.7	36.3	37.6
n = 455	85.94	3.45	78.6	80.6	85.7	92.1	95.6

VERTICAL GRIP REACH, STANDING - see Overhead Reach

VERTICAL TRUNK CIRCUMFERENCE, SITTING - see also Vertical Trunk Circumference, Standing

Subject sits erect with thighs slightly apart - the longitudinal circumference of the torso, from the midpoint of the right shoulder, downward following the surface of the back and waist, over the right buttock, through the crotch between the genitalia and the right thigh, upward over the abdomen and chest, back to the midpoint of the right shoulder.

USAF.MEN	62.44	2.87	56.1	57.7	62.4	67.2	69.6
n = 1236	158.60	7.28	142.4	146.5	158.6	170.8	176.7
USAFLY.MEN	63.51	2.74	57.4	59.2	63.4	68.2	70.3
n = 2420	161.31	6.95	145.8	150.4	161.0	173.2	178.5
USAF.WOM	59.08	2.58	53.7	54.9	59.0	63.4	65.5
n = 1905	150.07	6.56	136.4	139.4	149.9	161.0	166.3
USAFLY.WOM	60.90	1.70	57.0	58.1	60.9	63.7	65.2
n = 455	154.69	4.33	144.7	147.6	154.6	161.8	165.6

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

VERTICAL TRUNK CIRCUMFERENCE, STANDING - see also Vertical Trunk Circumference, Sitting

Subject stands erect with legs slightly apart - the longitudinal circumference of the torso, from the midpoint of the right shoulder, downward following the surface of the back and waist, over the right buttock, through the crotch between the genitalia and the right thigh, upward over the abdomen and chest, back to the midpoint of the right shoulder.

USAF.MEN	65.98	3.07	59.0	61.0	65.9	71.1	73.4
n = 1236	167.58	7.80	149.9	154.9	167.5	180.7	186.5
USAFLY.MEN	66.17	2.82	59.6	61.7	66.1	70.9	73.2
n = 2420	168.07	7.16	151.5	156.7	167.8	180.2	185.9
USAF.WOM	60.80	2.70	55.2	56.5	60.7	65.5	67.9
n = 1905	154.43	6.87	140.2	143.5	154.1	166.3	172.5
USAFLY.WOM	62.39	1.83	57.8	59.3	62.4	65.4	67.0
n = 455	158.46	4.64	146.7	150.6	158.4	166.0	170.1

-W-X-Y-Z-

-W-X-Y-Z-

-W-X-Y-Z-

WAIST BREADTH AT NATURAL BELTLINE, STANDING - see also Waist Breadth at Umbilicus, Standing and Waist Breadth over Foundation Garment, Standing

Subject stands erect - the horizontal distance across the trunk at the level of the natural waist (beltline).

USAF.MEN	12.14	1.01	10.1	10.6	12.1	13.9	14.8
n = 1236	30.84	2.57	25.6	26.9	30.7	35.3	37.5
USAF.WOM	9.50	.76	8.0	8.4	9.4	10.8	11.6
n = 1905	24.13	1.94	20.3	21.2	24.0	27.6	29.4
USAFLY.WOM	9.54	.58	8.2	8.6	9.5	10.6	11.0
n = 455	24.22	1.48	20.8	21.9	24.1	26.8	27.9

WAIST BREADTH AT OMPHALION, STANDING

Subject stands erect - the horizontal distance across the trunk at the level of Omphalion (Navel).

USAFLY.MEN	12.19	.94	10.1	10.7	12.2	13.8	14.7
n = 2420	30.96	2.39	25.8	27.2	30.9	35.0	37.3

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

WAIST BREADTH AT NATURAL BELTLINE OVER FOUNDATION GARMENT, STANDING - see also Waist Breadth at Natural Beltline, Standing

Subject (female) stands erect, wearing foundation garments of choice - the horizontal distance across the trunk at the level of the natural waist (beltline).

USAF.WOM	8.42	.76	7.0	7.3	8.3	9.8	10.6
n = 1513	21.39	1.92	17.9	18.6	21.2	24.9	26.9
USAFLY.WOM	8.43	.56	7.2	7.6	8.4	9.4	9.8
n = 345	21.42	1.41	18.4	19.2	21.3	23.9	25.0

WAIST CIRCUMFERENCE AT NATURAL BELTLINE, STANDING - see also Abdominal Extension Circumference, Standing; and Waist Circumference at Natural Beltline over Foundation Garment

Subject stands erect with abdomen relaxed - the circumference of the waist at the level of the natural lateral waist indentation.

USAF.MEN	33.28	3.18	27.2	28.3	33.1	38.7	41.1
n = 1236	84.53	8.07	69.2	71.9	84.2	98.4	104.3
USAF.WOM	26.46	2.16	22.7	23.4	26.2	30.4	33.1
n = 1905	67.20	5.48	57.6	59.5	66.5	77.2	84.0
USAFLY.WOM	26.30	1.43	23.2	23.9	26.3	28.7	29.6
n = 455	66.81	3.64	58.9	60.8	66.7	73.0	75.2

WAIST CIRCUMFERENCE AT NATURAL BELTLINE OVER FOUNDATION GARMENT, STANDING - see also Waist Circumference at Natural Beltline, Standing; and Abdominal Extension Circumference over Foundation Garment, Standing

Subject stands erect, wearing foundation garments of choice - the horizontal distance across the trunk at the level of the natural waist (beltline).

USAF.WOM	26.07	2.08	22.4	23.3	25.8	30.0	32.4
n = 1513	66.23	5.28	57.0	59.1	65.4	76.3	82.3
USAFLY.WOM	25.95	1.33	23.0	23.8	25.9	28.2	29.1
n = 345	65.92	3.38	58.4	60.4	65.9	71.7	74.0

WAIST CIRCUMFERENCE AT NAVEL, SITTING - see Waist Circumference at Omphalion, Sitting

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

WAIST CIRCUMFERENCE AT OMPHALION, SITTING - see also Waist Circumference at Omphalion, Standing and Waist Circumference, Natural, Standing

Subject sits erect - the horizontal circumference of the waist at the level of Omphalion (navel).

USAFLY.MEN	34.41	2.95	28.0	29.7	34.3	39.4	42.0
n = 2420	87.41	7.49	71.2	75.4	87.1	100.2	106.6

WAIST CIRCUMFERENCE AT OMPHALION, STANDING - see also Waist Circumference, Natural, Standing and Waist Circumference at Omphalion, Sitting

Subject stands erect - the horizontal circumference of the waist at the level of Omphalion (navel).

USAFLY.MEN	34.49	2.91	28.2	29.8	34.4	39.4	41.7
n = 2420	87.60	7.38	71.7	75.7	87.4	100.1	105.9

WAIST DEPTH AT NATURAL BELTLINE, STANDING - see also Waist Depth at Natural Beltline over Foundation Garment, Standing

Subject stands erect, looking straight ahead, heels together, weight distributed equally on both feet - the maximum horizontal depth of the torso at the level of the natural beltline during quiet breathing.

USAF.MEN	8.81	1.02	6.9	7.2	8.7	10.6	11.7
n = 1236	22.39	2.60	17.6	18.4	22.2	26.9	29.6

USAF.WOM	6.70	.66	5.5	5.8	6.6	7.9	9.0
n = 1905	17.01	1.67	14.0	14.8	16.8	20.2	22.9

USAFLY.WOM	6.62	.43	5.6	5.9	6.6	7.3	7.7
n = 455	16.82	1.08	14.2	15.0	16.8	18.6	19.5

WAIST DEPTH AT NATURAL BELTLINE OVER FOUNDATION GARMENT, STANDING - see also Waist Depth at Natural Beltline, Standing; and Abdominal Extension Depth, Standing

Subject (female) stands erect, looking straight ahead, heels together, weight distributed equally on both feet, wearing foundation garments of choice - the maximum horizontal depth of the torso at the level of the natural beltline during quiet breathing.

USAF.WOM	6.16	.73	4.9	5.2	6.1	7.5	8.7
n = 1513	15.65	1.85	12.5	13.2	15.4	19.2	22.1

USAFLY.WOM	6.07	.47	5.0	5.3	6.1	6.9	7.4
n = 345	15.41	1.19	12.7	13.4	15.4	17.4	18.8

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

WAIST DEPTH AT OMPHALION, STANDING - see also Waist Depth at Natural Beltline, Standing

Subject stands erect - the maximum horizontal depth of the torso at the level of Omphalion (navel), during quiet breathing.

USAFLY.MEN	8.78	.86	7.0	7.4	8.7	10.3	11.1
n = 2420	22.31	2.18	17.8	18.9	22.2	26.1	28.1

WAIST HEIGHT TO NATURAL BELTLINE, SITTING - see also Waist Height to Natural Beltline, Standing

Subject sits erect, feet resting on a surface so that the knees are flexed to a right angle, - the vertical distance from the sitting surface to the level of the natural lateral waist indentation.

USAFLY.MEN	9.24	.75	7.4	7.9	9.3	10.4	10.9
n = 4000	23.46	1.91	18.8	20.2	23.5	26.5	27.6

USAF.WOM	9.20	.68	7.6	8.1	9.2	10.3	10.8
n = 1905	23.37	1.73	19.2	20.5	23.4	26.2	27.5

USAFLY.WOM	9.53	.59	8.0	8.5	9.5	10.5	10.9
n = 455	24.21	1.50	20.2	21.7	24.2	26.7	27.6

WAIST HEIGHT TO NATURAL BELTLINE, STANDING - see also Waist Height to Natural Beltline, Sitting; Abdominal Extension Height, Standing

Subject stands erect, looking straight ahead, heels together, weight distributed equally on both feet - the distance from the floor to the level of the natural beltline.

USAF.MEN	41.50	2.09	36.8	38.1	41.5	44.9	46.5
n = 1236	105.42	5.31	93.5	96.7	105.4	114.1	118.0

USAF.WOM	39.48	1.77	35.7	36.7	39.4	42.5	43.8
n = 1905	100.28	4.50	90.6	93.1	100.1	107.9	111.2

USAFLY.WOM	41.00	1.33	38.3	38.9	40.9	43.3	44.7
n = 455	104.15	3.39	97.3	98.8	103.9	110.1	113.5

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

WAIST HEIGHT TO NATURAL BELTLINE OVER FOUNDATION GARMENT, STANDING - see also Waist Height at Natural Beltline, Standing and Abdominal Extension Height over Foundation Garment, Standing

Subject (female) stands erect, looking straight ahead, heels together, weight distributed equally on both feet, wearing foundation garments of choice - the distance from the floor to the level of the natural beltline.

USAF.WOM	39.68	1.73	35.8	36.9	39.6	42.6	43.8
n = 1905	100.80	4.40	90.9	93.7	100.7	108.2	111.3
USAFLY.WOM	41.17	1.32	38.4	39.1	41.1	43.5	44.9
n = 455	104.57	3.36	97.6	99.3	104.4	110.5	114.1

WAIST HEIGHT TO OMPHALION, STANDING - see also Waist Height, Sitting

Subject stands erect - the distance from the standing surface to Omphalion (navel).

USAFLY.MEN	41.92	1.86	37.6	38.9	41.9	45.0	46.3
n = 2420	106.47	4.72	95.6	98.7	106.4	114.3	117.6

WAIST-BACK LENGTH - see also Waist-Front Length and Anterior Waist Length

Subject stands erect - the surface distance from Cervicale down the middle of the back to the projected level of Omphalion (navel).

USAF.MEN	18.57	1.02	16.1	16.9	18.6	20.2	20.9
n = 1236	47.17	2.60	41.0	42.9	47.2	51.4	53.0
USAFLY.MEN	18.47	.93	16.4	17.0	18.4	20.1	20.7
n = 2420	46.92	2.37	41.6	43.1	46.9	50.9	52.6
USAF.WOM	15.95	.87	13.9	14.5	15.9	17.4	18.0
n = 1905	40.51	2.22	35.4	37.0	40.4	44.3	45.8
USAFLY.WOM	16.62	.72	15.0	15.5	16.6	17.9	18.4
n = 455	42.21	1.84	38.1	39.3	42.1	45.4	46.7

WAIST-FRONT LENGTH - see also Anterior Waist Length and Waist-Back Length

Subject stands erect - the surface distance from Suprasternale to the center of the navel.

USAF.MEN	15.65	.96	13.5	14.1	15.6	17.3	18.3
n = 1236	39.76	2.45	34.4	35.9	39.6	44.0	46.4

(Cont'd)

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm
USAFLY.MEN	15.91	.87	14.1	14.5	15.9	17.4	18.2
n = 2420	40.42	2.22	35.8	36.9	40.3	44.2	46.2
USAF.WOM	13.22	.77	11.6	12.0	13.2	14.5	15.2
n = 1905	33.58	1.96	29.4	30.5	33.5	36.9	38.6
USAFLY.WOM	13.61	.72	12.0	12.4	13.6	14.8	15.7
n = 455	34.57	1.82	30.4	31.6	34.5	37.7	39.8

WEIGHT (MASS) (in LBS AND KGS)

The subject is nude or wearing brief undergarments - read to the nearest pound.

USAF.MEN	167.22	23.14	118.6	130.3	166.4	206.7	227.9
n = 1236	75.87	10.59	53.8	59.1	75.5	93.8	103.4
USAFLY.MEN	173.54	21.42	127.6	140.2	172.4	210.7	227.7
n = 2420	78.74	9.72	57.9	63.6	78.2	95.6	103.3
USAF.WOM	127.24	16.57	96.3	102.3	126.1	156.3	175.2
n = 1905	57.73	7.52	43.7	46.4	57.2	70.9	79.5
USAFLY.WOM	131.16	10.69	105.6	112.4	131.8	147.9	153.6
n = 455	59.51	4.85	47.9	51.0	59.8	67.1	69.7

WRIST BREADTH, BONE

Subject stands (Typ) - the maximum bony distance across the wrist between the medial epicondyle of the ulna and the lateral epicondyle of the radius of the right forearm.

USAF.MEN	2.30	.13	2.0	2.1	2.3	2.5	2.6
n = 1236	5.84	.32	5.1	5.3	5.8	6.4	6.6

WRIST CIRCUMFERENCE

Subject stands (Typ) - the minimum circumference of the wrist proximal to the styloid process of the ulna.

USAF.MEN	6.79	.33	6.1	6.3	6.8	7.3	7.6
n = 1236	17.24	.83	15.4	15.9	17.2	18.6	19.2
USAFLY.MEN	6.93	.36	6.2	6.4	6.9	7.6	7.9
n = 2420	17.59	.92	15.7	16.2	17.5	19.2	20.0
USAF.WOM	5.89	.28	5.3	5.4	5.9	6.4	6.6
n = 1905	14.96	.71	13.4	13.8	14.9	16.2	16.8
USAFLY.WOM	5.98	.24	5.4	5.6	6.0	6.4	6.6
n = 455	15.20	.60	13.8	14.2	15.2	16.3	16.7

SOURCE	\bar{X}	SD	1%	5%	50%	95%	99%
N	in cm	in cm	in cm	in cm	in cm	in cm	in cm

WRIST HEIGHT, STANDING

Subject stands erect, arms hanging naturally - the vertical distance from the standing surface to the notch distal to the styloid process of the radius of the forearm at the wrist (Stylian).

USAF.MEN	33.86	1.65	30.0	31.1	33.9	36.6	38.0
n = 1236	86.00	4.18	76.1	79.1	86.0	92.9	96.5
USAFLY.MEN	34.09	1.55	30.6	31.6	34.0	36.7	37.8
n = 2420	86.58	3.94	77.6	80.2	86.5	93.3	96.0

GLOSSARY OF SELECTED TERMS

ABDUCT (abduction) - to move from a position near or parallel to the axis of the body or body part.

ACROMIAL - pertaining to the acromial process of the scapula (shoulder blade).

ACROMIALE - landmark title for the most lateral point on the acromial process of the scapula (shoulder blade). Frequently interchangeable with Acromion.

ACROMION - the most lateral point on the acromial process of the scapula (shoulder blade). Frequently interchangeable with Acromiale.

ADDUCT (adduction) - to move toward a position closer or more parallel to the axis of the body or body part.

ANTERIOR - pertaining to the front (ventral) part of the body.

ANTERIOR SUPERIOR ILIAC SPINE - the uppermost of two pairs of prominences (the other being the Anterior Inferior Iliac Spine) on the anterior (ventral) rims of the ilia, one pair of the several bones comprising the bony pelvis.

ARM - the segment of the upper limb between the gleno-humeral joint (shoulder) and the elbow, commonly, but incorrectly referred to as the "upper" arm.

AURICLE - the largely cartilaginous external ear (pinna).

AURICULAR - referring to the auricle.

AXILLA - the armpit.

AXILLARY - referring to the axilla, the armpit region.

BALL OF FOOT - the fleshy "cushioning" found on the plantar surface of the foot in the region of the distal ends of the metatarsal bones.

BICEPS - the large muscle on the anterior aspect of the arm.

CANTHUS (pl. canthi) - the "corners" of the eyes, medial (internal or endo-) and lateral (external or ecto-).

CERVICAL SPINE - that part of the vertebral column within the neck.

CERVICALE - landmark title for the spine of the 7th cervical vertebra.

CORONAL (PLANE) - the vertical (frontal) YZ plane.

CRANIUM - the upper part of the skull, bounded by the brow ridges, external auditory meatuses and the occiput.

CRINION - landmark title for the point in the midsagittal (XZ) plane of the forehead at the hairline.

DACTYLION - landmark title for the tip of the middle finger.

DELTOID MUSCLE - the triangular mass of muscle covering the point of the shoulder, originating from the clavicle, acromion and scapula and inserting onto the shaft of the humerus.

DISTAL - away from a point of origin or from the torso, opposite of proximal.

ECTOCANTHUS - see Canthus

ENDOCANTHUS - see Canthus

EPICONDYLE - immediately adjacent (toward the midsection of the bone involved) to the condyle or articular surface of a joint.

EXTERNAL - farther away (relatively) from the center or central axis of the body or body segment.

EXTERNAL CANTHUS - see Canthus

FIBULA - the most lateral of the two long bones of the leg.

FRANKFORT PLANE - a standard plane of orientation of the head, realized when the lowest point in the margin of the left eye socket (orbit) and the left tragion (superior margin of the external auditory meatus) are in a common horizontal plane.

FRONTAL (PLANE) - the vertical (coronal) YZ plane.

GLABELLA - landmark title for the most forward point in the midline of the forehead between the brow ridges.

GLUTEAL FURROW - the furrow formed by the juncture of the buttock and the posterior aspect of the thigh.

GONIAL ANGLE - the angle at the posterior aspect of the lower jaw (mandible) formed by the intersection of the vertical portion (ramus) with the lower edge of the horizontal portion (body) just inferior to the ear lobe (Gonion).

HELIX OF THE EAR - the external ear (pinna).

HUMERUS - the long-bone of the ("upper") arm.

ILIOCRISTALE - landmark title for the superior rim of the ilium in the mid-lateral line.

ILIUM (pl. Ilia) - one of the three (pairs of) bones of the pelvis, the others being the ischium and pubis.

INDEX FINGER - digit II of the hand, next to the thumb: the forefinger.

INION - landmark title for the (usually) prominent bony protuberance at the posterior of the head: the external occipital protuberance.

INTERNAL CANTHUS - see Canthus.

LANGER'S LINES (Lines of Lynd) - directions along which the skin will more easily fold or tear due to the orientation of underlying collagen fibers.

LARYNX - the organ of voice production. The "Adam's Apple" is the most obvious external manifestation.

LATERAL - to the right or left of the vertical fore-and-aft mid-line (mid-sagittal) plane of a bilaterally symmetrical body: orthogonal to the plane of symmetry: opposite is medial.

LEG - the segment of the lower limb between the knee and the ankle: the shank.

MALLEOLUS - the projecting distal heads of the Fibula (laterally) and of the Tibia (medially) at the ankle.

MANDIBLE - the lower jaw.

MASTOID PROCESS - the bony projection of the Temporal bone of the skull just behind the ear.

MEDIAL - toward (relatively) the mid-line (midsagittal) plane of the body: opposite is lateral.

MENTON - landmark title for the lower surface of the tip of the chin in the midsagittal plane.

METACARPAL - any of the five long bones of the palm between those of the wrist (carpals) and those of the fingers and thumb (phalanges).

METACARPAL-PHALANGEAL JOINT - any of the five joints of the hand between the metacarpal bones of the palm and the first phalanges of the fingers and thumb.

METACARPALE - landmark title for the bony prominence (knuckle) on the back (dorsum) of the hand formed by the joint between the third metacarpal and the phalanx of the third (middle) finger.

NATURAL WAIST - the level of greatest lateral indentation in the abdominal region. If no natural waist can be determined, the level at which the belt is worn can be substituted.

NAVICULAR BONE - a carpal bone of the wrist. The proximal edge of the navicular bone roughly corresponding to the distal wrist crease at the base of the thumb, from which Hand Length is measured.

OCCIPUT - the most posterior portion (prominence) of the occipital bone, at the back of the head.

OLECRANON PROCESS - the bony tip of the elbow: the bony prominence at the proximal extreme of the ulna, one of the two long bones of the forearm.

OMPHALION - landmark title for the navel (umbilicus).

PATELLA - the kneecap.

PHALANGEAL - referring to a phalanx or to the phalanges, the long bones of the fingers and toes.

PHALANX (pl. Phalanges) - any of the long bones of the fingers and toes.

PHILTRUM - the shallow groove running from the upper membranous lip to the base of the nasal septum.

PINNA - the primarily cartilaginous external ear.

POPLITEAL - pertaining to the area of the back of the leg directly behind the knee.

PRONASALE - landmark title for the tip of the nose.

PROSTHION - landmark title for the gumline between the two upper medial incisor teeth.

PROXIMAL - the end or portion of a body segment closest to the trunk - opposite is distal.

RADIAL - referring to the radius, one of the two long bones of the forearm on the thumb side.

RADIALE - landmark title for the space between the articular surface of the proximal head of the Radius and the lateral epicondyle of the Humerus, at the elbow.

RADIUS - one of the two long bones of the forearm on the thumb side.

RAMUS (pl. Rami) - a projecting part, elongated process. The horizontal (body) as well as the posterior more or less vertical (ascending) part of the lower jaw (Mandible). The latter ramus articulates with the skull.

SCYE - the shirt sleeve hole.

STERNUM - the "breastbone."

STOMION - the point of contact between the upper and lower lips in the midsagittal plane.

STYLION - landmark title for the tip of the styloid process of the radius, on the thumb side of the wrist.

STYLOID PROCESS (Radial and Ulnar) - blade-like boney projections of each, the Radius and Ulna, at the wrist.

SUBMANDIBULAR - under the mandible or lower jaw.

SUBNASALE - landmark title for the point inferior to the nose where the base of the nasal septum meets the philtrum.

SUBSTERNALE - landmark title for the middle of the lower end of the breastbone.

SUPINE (Supination) - lying on the back, face or ventral (anterior) surface upward.

SUPRASTERNALE - landmark title for the lowest point of the (jugular) notch at the upper end of the breastbone (sternum).

TRAGION - landmark title for the notch just above the tragus of the ear. This point corresponds approximately to the upper edge of the ear hole (external auditory meatus) of the skull.

TRAGUS - the small cartilaginous flap in front of the ear hole.

ULNA - one of the two long bones of the forearm on the little finger side of the forearm.

ULNAR - referring to the ulna.

UMBILICUS - the navel.

XIPHOID PROCESS - the inferior segment of the sternum.

ZYGOMATIC ARCH - the bony arch running along the side of the cheek to the ear, formed by the zygomatic process (Zygoma) of the Temporal and the Zygomatic bones of the skull.

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